Wild Life of New Mexico

Its Conservation and Management

J. Stokley Ligon

Published by
NEW MEXICO STATE GAME COMMISSION

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Being a Report on the
Game Survey of the State
1926 and 1927

By J. STOKLEY LIGON

Photographs, Unless Otherwise Stated, by Author.

State Game Commission
Department of Game and Fish
Santa Fe, New Mexico

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ANNOUNCEMENT

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SANTA FE NEW MEXICAN PUBLISHING CORPORATION

LETTER OF TRANSMITTAL

STATE OF NEW MEXICO
Department of Game and Fish
Santa Fe, N. M., July 1, 1927.

Sir:

We have the honor to transmit herewith report entitled "Wild Life of New Mexico, Its Conservation and Management" by J. Stokley Ligon, a Federal Government specialist, employed by the Commission to make a survey of the game resources of the State.

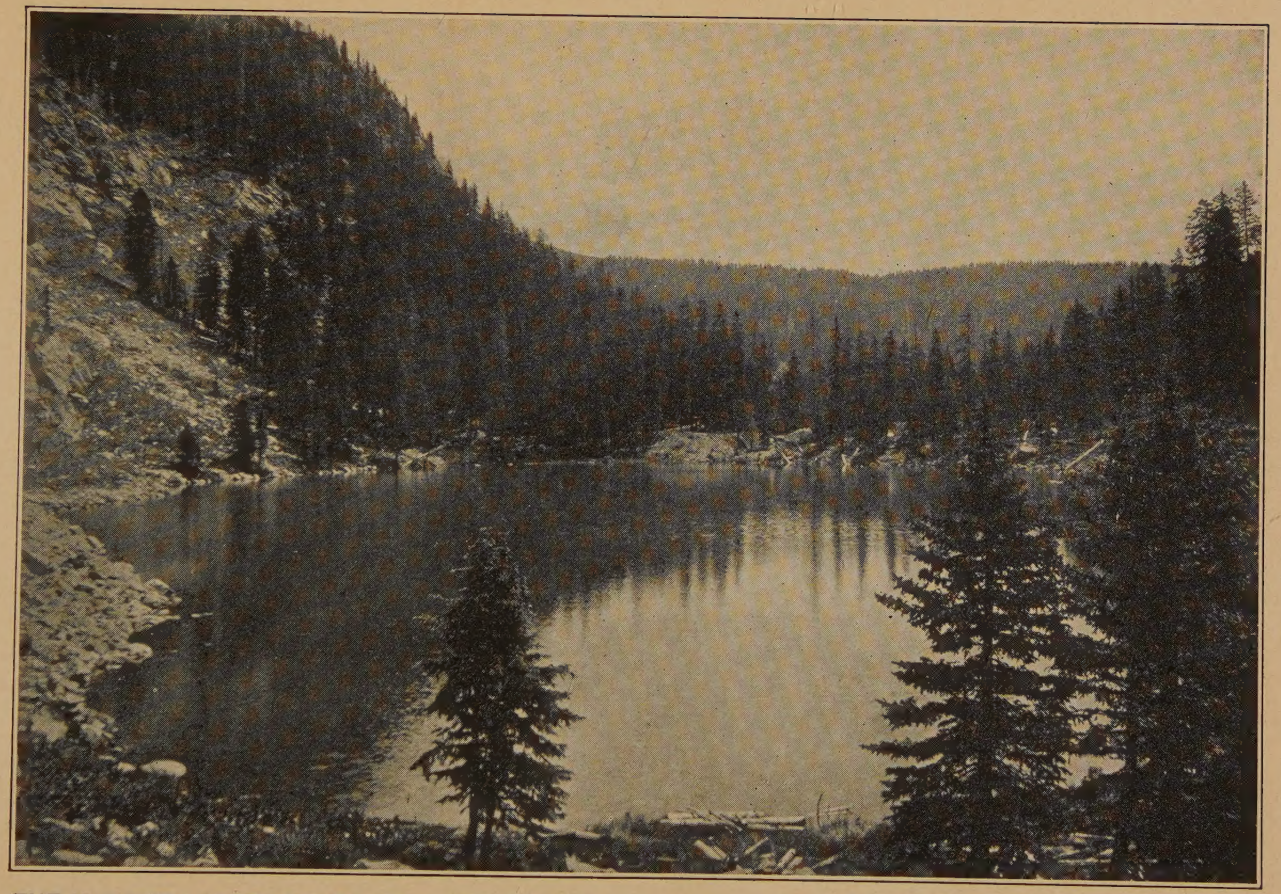
Wild life in New Mexico, as in every other state, is now recognized as one of its great assets. Abuse and waste have resulted in the extermination of some species and have threatened the existence of every valuable species indigenous to the State. Constructive policies in game management in the past have been hampered or lacking as result of political interference and because theories have been too readily accepted without ascertaining basic facts. Realizing that before any intelligent program of wild life conservation could be instituted, facts and reliable data were necessary, the State Game Commission, with the approval of the State Game Protective Association, secured the services of Mr. Ligon from the U. S. Biological Survey for the purpose of making a state-wide survey not only of the wild life but of conditions having a direct bearing on the present and future game supply. The survey, as it progressed, expanded into new fields of endeavor, and extended over a period of fourteen months. The scope of the survey has been broad, dealing with the present status and distribution of all game, means of bringing about its increase and better conservation methods. Rechecking established game refuges, completing the system of big game refuges and demonstrations in the capturing and transplanting of game were also made a part of the survey.

Although this is a departure from established Game Department policies of the country, we believe that this report will supply a long felt need in game management and that through it the foundation will have been laid for a sound progressive policy that will insure restoration and perpetuation of the wild life of New Mexico.

Respectfully,

CHARLES PROEBSTEL (Chairman)
K. J. BALDRIDGE
W. A. LOSEY
Commissioners

HON. RICHARD C. DILLON,
Governor of New Mexico.



THE HIGHEST DEGREE OF UTILITY, INTEREST AND BEAUTY IS COMBINED IN MOUNTAINS, FORESTS AND LAKES. SANTA FE LAKE, SANGRE DE CRISTO RANGE

ACKNOWLEDGMENTS

In gathering the information for this report my chief aim has been to present facts as I found them rather than to try to make them conform to pleasant theories. That parts of it call for differences of opinion, I fully realize. Its value as a whole, however, I trust will be found to justify those responsible for this unusual undertaking.

Without the splendid cooperation on the part of interested individuals and organizations, I would have despaired of the results in the brief period of time at my disposal for so large a task. I am indebted to Judge Colin Neblett, President of the State Game Protective Association, and to the leaders and members of every local association in the State for their unreserved cooperation and support. To the U. S. Biological Survey I am greatly indebted for assistance rendered in a variety of ways; and a similar acknowledgment is due the U. S. Forest Service, not only for the liberal cooperation in all phases of field work but for assistance given by the District Office in the drafting of maps. Without the generous assistance of these two government bureaus, an effective survey in the time available would have been impossible. To Dr. E. W. Nelson, until recently Chief of the Biological Survey, I take pleasure in expressing my gratitude for his advice and also for the invaluable service he rendered in critically reading the manuscript of this report and giving it the benefit of his wide field experience in New Mexico as elsewhere in the west. To the present Game Commission and to the Game Warden, as well as to the former Commission, consisting of Mr. T. C. Hill, Chairman, Mr. Charles Proebstel and Mr. Arthur Sisk, I wish to express my gratitude and deepest appreciation for their encouragement, untiring aid and the absolute freedom given me while conducting the survey.

J. Stokley Ligon

Santa Fe, New Mexico
June 22, 1927.

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Seven Rivers
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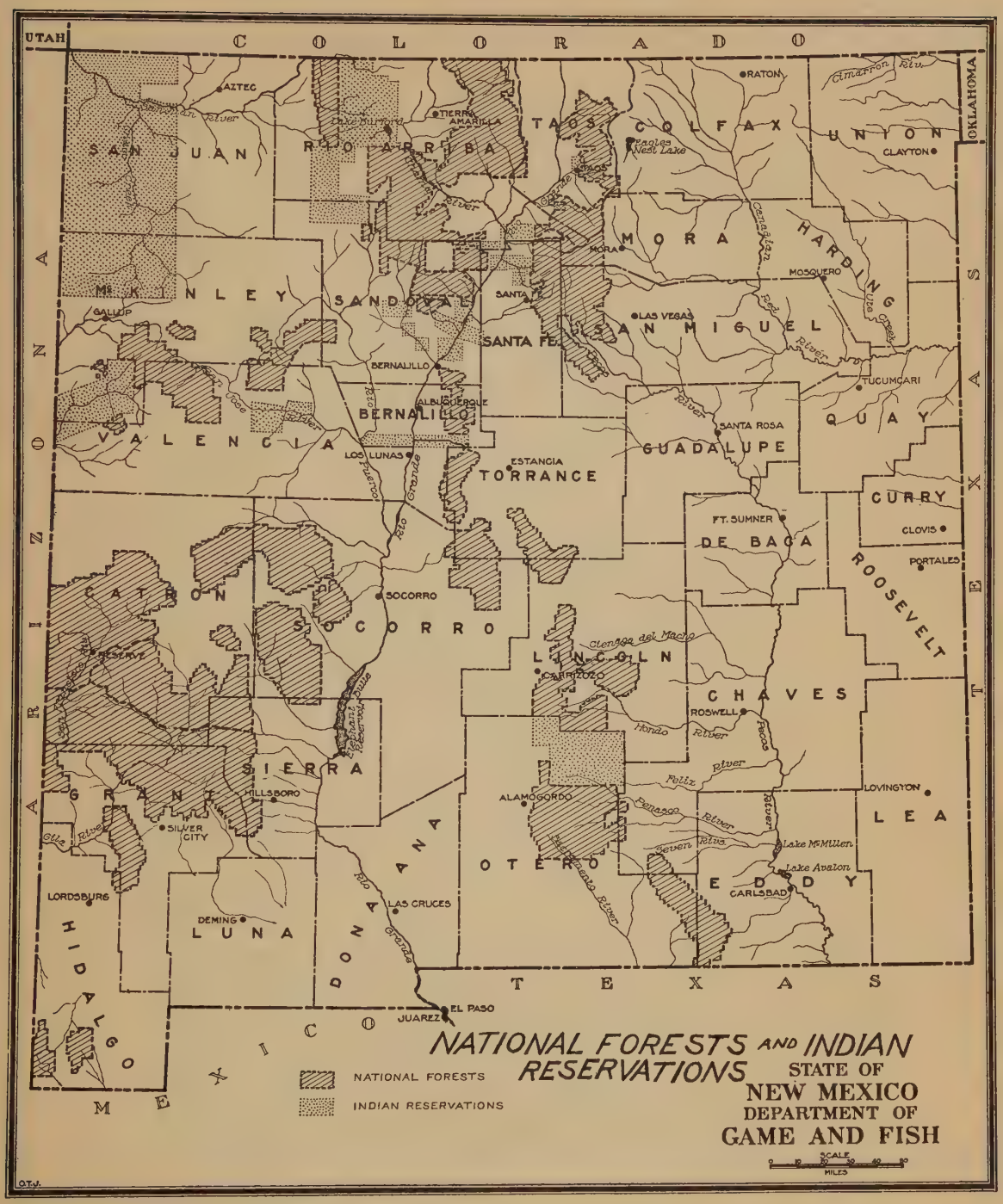
Peloncillo Mts.
Lava
Sand
Mountains
SCALE
MILES
MAP SHOWING PRINCIPAL MOUNTAINS, SAND AND LAVA AREAS OF THE STATE
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
O.T.J.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NATIONAL FORESTS
INDIAN RESERVATIONS
NATIONAL FORESTS AND INDIAN RESERVATIONS
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Photograph by U. S. Forest Service

THE FISHERMAN'S RETREAT—UPPER PECOS, SANGRE DE CRISTO RANGE

WILD LIFE OF NEW MEXICO

Its Conservation and Management

INTRODUCTION

New Mexico is a land of rich natural endowments. Few other states of the great American Union possess such wide variation in topography, climate and natural resources or enjoy such prevalence of unimpaired sunshine. The diversified climate, from the mild temperatures of the broad valleys and plains of the southern area of the State to that of the true arctic climes in the highest mountains of the northern area, gives rise to a wealth of flora and fauna. Widely variant types of plant and animal life are found between these extremes in elevation of less than 3,000 feet in the lower Pecos Valley to 13,600 feet on Wheeler Peak, the highest point.

New Mexico was formerly a hunter's paradise; but the history of its wild life resources, for the last fifty years, is that of every other state in the Union—spoliation and waste—waste not only of the bountiful supply of wild animals and birds but of vast areas of prairie and mountain forage. Today New Mexico's wild life resources are poverty stricken. Fortunately, it is not too late to restore, at least partially, the places for and requirements of wild life and incidentally the wild life itself. But the restoring of these resources calls for the cooperation of many allied interests—sportsmen, ranchmen, farmers, civic organizations and State and Federal Governments.

Formerly Nature administered wisely her conservation policies; she maintained an equilibrium for the benefit of her subjects; but this equilibrium was long ago disrupted and can no longer function unaided. It can never be restored in full unless the land were permitted to revert to its primitive state.

The encroachment of economic conquest on the wilderness was inevitable in the progress of civilization; and as man has destroyed the natural balance, he must assume the responsibility of establishing and maintaining an artificial one. He must now combat disease, endemic and epidemic, and control predatory animals if he would have the increase in game; he must control forest fires and avoid range abuse and erosion if he would hold the soil and grow forage; and, finally, he must utilize surplus game if he would protect it from over-production.

The establishment of game refuges, smaller bag limits and close seasons, alone, will not restore the diminished game supply. The ailments which brought about the present situation are deeper seated and require more drastic treatment. Moreover, time was required to break down the strong natural resistance to the devastation that has occurred and obviously more time, as well as painstaking effort, will be required to restore and maintain between natural and artificial resources the necessary equilibrium, a thing we as yet know little about.

Character of general topography, plant life and the use being made of the land by man are now determining factors in the potential wild game supply. Commercial activities and agriculture must have their places; but there must also be recreational areas and there must be wild life. As respects wild game, New Mexico is especially favored. Its big game territory is extensive and much of it is of such a nature—mountains and forests—that it can never be intensively used for agriculture and livestock raising. Conservationists, therefore, have every incentive to feature the wild life of the State. The mountains, forests and wild life, collectively, are vastly more valuable to the State than is now generally appreciated.

In the future the average hunter, fisherman or other recreation seeker will look to the National Forests as the scene of his outings. The popularity of the National Forests is increasing at a tremendous rate and, happily, their administration is being directed more and more in the interests of the public. Grazing of domestic animals is not the only source of monetary return from these national playgrounds. If game were restored to anything like its former abundance, revenue to the citizens and to the State might be in excess of that which can be realized from grazing domestic animals on great areas of the forests.

When we consider the fact that hunters coming into the State pay as much as $500 for the use of a ranch house alone during the ten day big game season; or the same amount for a guide and field equipment to get to bag a mountain lion or bear; or, as is true in several instances in the State, an individual, favorably located with necessary equipment, earns a thousand dollars or more during the hunting season, merely getting hunters in and out of the hunting territory; to say nothing of the revenue to business men and other citizens along the routes of travel, the possibilities of returns from big game country are appreciated. That it would be only good business to give the land a chance to render its highest appeal and to give game an opportunity to be most productive is attested by these facts.

The recreational phase of our mountains and forests is subject to vast development and expansion. The monetary and recreational values to be derived directly from the forests are not the only returns in store. Conditions necessary for the restoration and maintenance of a normal supply of wild life are also conducive to plant life supremacy and, incidentally, to conservation of watersheds. Moreover, the livelihood of thousands of home builders in the rich reclaimed agricultural valleys throughout the southwest is reliant on the proper conservation of water in the mountains. Elevated watersheds, normally covered with vegetation, are a most essential factor for successful agriculture in the valleys of the arid southwest.

Fortunately, there has occurred in New Mexico on the part of the sportsmen and conservationists an awakening to the true state of conditions that confront them. They have begun to appreciate the gravity of the situation and have set themselves to the task of solving the complex problem of saving not

only the remaining wild life but of restoring decimated numbers of such life on its present range and expanding the distribution of all species on suitable unoccupied range.

In diverting the minds and attention of people from the ever-pressing grind of modern rapid-transit civilization, outdoor attractions render their greatest service to mankind. We are all beginning to appreciate more the value and beauty of wild creatures in their own comforting fields and forests; but heretofore in America destruction of forests and game, companion resources, has been swift and reckless. If we are to save the situation, there is no longer time for delay; action is needed. Here lies the duty of conservationists through work and education. The true sportsman is rapidly emerging from the age of destruction and waste to a higher plane of appreciation. When he goes afield even though he does not bag his game, he realizes that his reward has been manifold in increased health, happiness and the joy of friendly rivalry in the pursuit. The killing impulse, a heritage from ancient times, is gradually being superseded by higher standards of sportsmanship—to hunt for the joy of hunting and the thrills of being in wild places.

Conservation not only of game but of other natural resources is now becoming an integral part of the State's affairs. The importance of conserving natural resources, including game, reaches beyond the State; it involves the welfare of our sister states and the nation. Citizens of New Mexico are concerned in the proper restoration and conservation of watersheds and wild life in Arizona, Colorado, Oklahoma, Texas and other states. Once the wild life resources of our neighboring states become depleted, hunting and fishing grounds in New Mexico will be overtaxed. Likewise other states are interested in every phase of conservation in New Mexico. Abuse and neglect in one state are bound to react all the way across the continent. Conservation of wild life is not only the business of a state but of the nation; and like all other national assets needs to be closely administered as a great related unit.

The great treasure vaults of Nature are still productive although they have been shamefully drained. The time has come when we must restore the capital stock. While we may give little thought to the importance and value our descendants will place on the wild game 250 years hence, we do know that it is our duty to pass this great heritage on to posterity with as little decrease as possible.

The present movement toward instilling a greater appreciation for the aesthetic value of wild life is made evident by the generally expressed desire to have some impaired wilderness areas restored to the primitive; forest beauty developed and unproductive, abused range lands healed so Nature may contribute again to the productiveness of the land. Public sentiment and public support are the forces necessary to foil individual selfish interests, the greatest hindrance to conservation, and to promote the high ideals necessary in aiding Nature to function properly.

New Mexico possesses rare natural beauty and abounds in romance. A

charming interest associates itself with its mountains and their fascinating names, such as Sacramento, Capitan, Mogollon, Truchas, Datil, Taos and Jemez. When once seen in their natural beauty of outline and majesty, they ever lure the beholder back to their enchanting splendor. Its turbulent streams, such as the Brazos, Santa Barbara, Rayado, Vermejo, Chama, Pecos, Ruidoso and many others, roaring and tumbling from their arctic sources of snow fields and cool summer rains; and lakes, as Costilla, Cabresto and Latir with their rare settings, all add an infinite charm to the great lofty rugged spaces.

The early explorers among the adventurous Spaniards, who came up from the south leading by many decades the English speaking pioneers—Kit Carson and other blazers of the Santa Fe trail—left their indelible impress in these names of beauty and romance that have survived and become more popular as the ages pass. These beauty spots, monuments to Nature's handiworks, demand that they be conserved unspoiled. The wild life is a part of these mountains, lakes and streams; it must remain to animate, enrich and complete the scene.

Artificial tendencies, tendencies that lead away from the simple normal life are rendering the problem of living in the United States a most complex one. We may well dedicate the mountains, forests, streams and wild life to the high purpose of simplifying these infectious tendencies by permitting them to again function normally. Lovers of Nature are numbered among the happiest people; they get the most out of life and usually live to enjoy active old age. A more attractive and appealing out-of-doors would no doubt have a tendency to mitigate crime and decrease the number of wasted lives. Both sight and pursuit of the elusive wild creatures, large and small, are highly profitable employers of mind and body.

A NEW ERA DAWNING:

Saving and increasing wild life are not merely a need but a duty and, happily, New Mexico is entering a new era in wild life conservation. The accomplishments that have been recorded, however, are merely the preliminaries for real conquest in the field of conservation. Fortunately, the sportsmen of the State are big enough and possess sufficient vision that the problems which bristle out before them shall not stand unconquered, if kept free, as is now the case, from political contamination.

Good roads and more leisure on the part of people with the consequent increase in travel to and through the State, demand that the natural resources of New Mexico, particularly the wild life and forest resources, be safeguarded and placed on the highest productive basis.

Increased respect for game laws; an adequate system of game refuges; cooperation of the U. S. Biological Survey in controlling predatory animals and forage destroying rodents, and in protecting migratory birds; policies of the U. S. Forest Service looking toward better conservation of forage on the National

Forests; and improved methods of restocking waters with fish are all important features in the New Mexico wild life protective plan. Plans, as projected, for restocking areas with native game, from which such game has been exterminated; the establishment of native game, as quail, on areas where reclaimed conditions are promising for their welfare; giving certain species, as antelope, mountain sheep and prairie chickens, long threatened with extermination, an opportunity to increase their numbers and expand their range; and the introduction of tried and safe exotic species are all being given the most careful consideration. Elk, one of the exterminated species, have already been reintroduced, and sage grouse are to be brought back to most suitable areas of their former habitat.

With the exception of a few individuals, practically everywhere a determined disposition is evident on the part of ranchmen to protect and increase the game supply. Practically every square mile of the State may be made productive of some form or forms of game or fish, and ranchmen with vision will ultimately profit by the protection they are according wild life. In the future, sportsmen of means will pay for the privilege of getting their game where certainty of its presence and dispatch enter as deciding factors.

The crisis in New Mexico game conditions was no doubt reached about 1924. All species were at their lowest ebb of production and were most threatened about that time. The increase since then, with the exception of quail, which rapidly recruited their numbers under improved conditions, has been slow but marked. If the safeguards now provided are continued and additional aids are introduced, we may feel assured that the most dangerous period has been passed, even though it is a fact that hunting during the last few years has been drawing with maximum force on the game supply from every nook and corner of the State where game occurs.

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ALAMOGORDO
LAS CRUCES
DEMING
SILVER CITY
HILLSBORO
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EL PASO
JUAREZ
LIFE ZONES OF NEW MEXICO
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Transition and Canadian (Combined)
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Upper Sonoran
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WILD LIFE AND ENVIRONMENT

All wild life is dependent on the climate and vegetation of its chosen range. New Mexico possesses all of the life zones of North America, except the Tropical, within its varying altitudes between less than 3,000 feet in the southern part to more than 13,500 feet on its highest peak in the north.

Each species is to a greater or less extent a characteristic part of its chosen zone, or zones. The well defined life zones with their characteristic plant life, are responsible for the presence of more than 15 distinctive game animals, of 10 species of resident land game birds, the many species of fish and for a great variety of non-game birds. In the variety of non-game birds New Mexico is exceeded by only a few states in the Union.

To appreciate fully the strategical situation of New Mexico and the advantage of diversified elevations as relates to wild life, we need only to compare its wealth of species with the limited number that inhabit the plains states west of the Mississippi River, where the climatic conditions and plant life are more uniform.

VALUE OF MOUNTAINS:

All sections of New Mexico, except the extreme southeastern part, which belongs to the Staked Plains, are characterized by isolated mountains or by mountain ranges. There are within the State more than 40 distinct mountains, groups of mountains and mountain ranges with elevations from 8,500 feet to more than 13,000 feet. Between and about the mountains occur broad, arid valleys and table lands, (locally known as mesas) often cloven by deep, rugged canyons. Below 7,000 feet elevation rainfall is not sufficient to insure crops, without resorting to irrigation, except in the eastern section of the State. At high altitudes, low temperatures lessen moisture evaporation while at lower altitudes the aridity and heat rapidly evaporate water and the moisture from the plants unless they have protective characters.

The least precipitation occurs in the extreme northwestern section of the State, where in some localities the average over a period of years is only about seven inches annually, and in the central and lower Rio Grande Valley where, in some places, the average is no more than nine inches. In the higher and more extensive mountainous regions conditions, however, are very different. At Cloudcroft, on the Sacramento Mountains, Otero County, at an elevation of 8,650 feet, the annual precipitation is about 23 inches, (75 inches of snow included) while at Alamogordo, about 15 miles to the westward but off the mountains, at an elevation of 4,250 feet, the annual precipitation is only a little over 11 inches. At Pinos Altos, in Grant County, with an elevation of 7,253 feet, the average annual precipitation is more than 25 inches, (78 inches of snow included) while at Silver City, 12 miles to the southward, at an elevation of 5,937 feet, the precipitation is

less than 18 inches. At the Anchor Mine, at an elevation of 10,600 feet, in Taos County, the precipitation is 35 inches, (317 inches of snow included), while at Taos, at an elevation of 6,983 feet, but off the mountains to the southwest, the annual precipitation is only 13 inches.

These figures clearly demonstrate one phase of the value of mountains to New Mexico. Not only is the State thus greatly enriched by the timber, wild game and recreational advantages, but they supply the water for towns and agriculture, rendering habitable for man hundreds of miles of rich valleys throughout the State.

LIFE ZONES:

The greater the diversification in altitude, the greater are the number of life zones in a state or region but the more limited, as a rule, is the range or habitat of a given species. The antelope and scaled quail are widely distributed in New Mexico because they occupy an intermediate type of land—prairies, open valleys and mesas—of which there is a great extent throughout the State. Mule deer are also widely spread as they adapt themselves to all the life zones. Their habitat lies in the broken, wooded areas in all zones except the Arctic, which is so limited in area that in New Mexico it has no characteristic big game.

The relation of climatic conditions and the accompanying vegetation to the existence of wild life is very intimate and must be given close attention. We cannot move antelope, mountain sheep and prairie chickens or wild turkeys from their natural life zones and expect them to thrive. Any plan for increasing or transplanting the various species must always take into consideration the conditions of their natural environment.

In order to show the present range of game and parts of the ranges it formerly occupied but from which it is now absent, as well as ranges in which native species have been established outside of the area they originally occupied, I have prepared distributional maps of the different species of game animals and birds indigenous to the State.

It is of interest to trace the distribution of the species in the State and to note how, as a rule, they are generally limited to their respective zones. New Mexico has five distinctive life zones, as follows:

1. *Lower Sonoran:*

This zone in which mesquites, the sotol, cacti, and many other desert plants abound, constitutes approximately one-eighth of the State's total area. Its altitudes range from the lowest, less than 3,000 feet, to about 4,500 feet. This zone being the lowest and in the southern area, comprises the warmest part of the State.

Antelope, Gambel and scaled quail are its characteristic species.

2. *Upper Sonoran:*

This is the life zone of the junipers and pinyon pines in intermediate altitudes, ranging from about 4,500 feet to 7,500 feet. It comprises fully two-thirds

Upper: Truchas Peaks, Sangre de Cristo range, arctic life zone in July
Lower: Typical Canadian Zone Forest near Taos

Upper: Typical Transition Zone park scene. Mt. Taylor Mesa
Lower: Lower Sonoran desert plant life. Hidalgo County

of the State's area. Unlike the Lower Sonoran Zone, it is distributed well over the State.

Mule and white-tailed deer, mountain sheep, antelope, prairie chickens, scaled, Gambel and Mearns quail inhabit it.

3. *Transition Zone:*

This is the zone of yellow pines and of marked changing conditions, between the intermediate and high elevations, ranging from about 7,500 feet to 9,500 feet. The Transition Zone, which comprises perhaps no more than one-twentieth of the State's area, is the most important of the zones for big game, as it contains good forest cover and the best food supply. It is the favorite habitat of deer, bears and turkeys.

Elk, mule and white-tailed deer, mountain sheep, black and grizzly bears, Abert squirrels, turkeys, Mearns quail, dusky grouse and band-tailed pigeons constitute its most characteristic species.

4. *Canadian Zone*:

This is the zone of spruce, fir and aspens. Its altitudes range from about 9,500 to 12,000 feet and contains a very small percentage of the State's area. Being confined to the higher elevations of a dozen mountain ranges or isolated mountain groups, it is, for the most part, of a precipitous nature which makes it less valuable for game than the lower zones, except as a refuge for some big game animals.

Bears, especially grizzlies, dusky grouse, snowshoe rabbits and red squirrels are its characteristic species.

5. *Arctic Zone:*

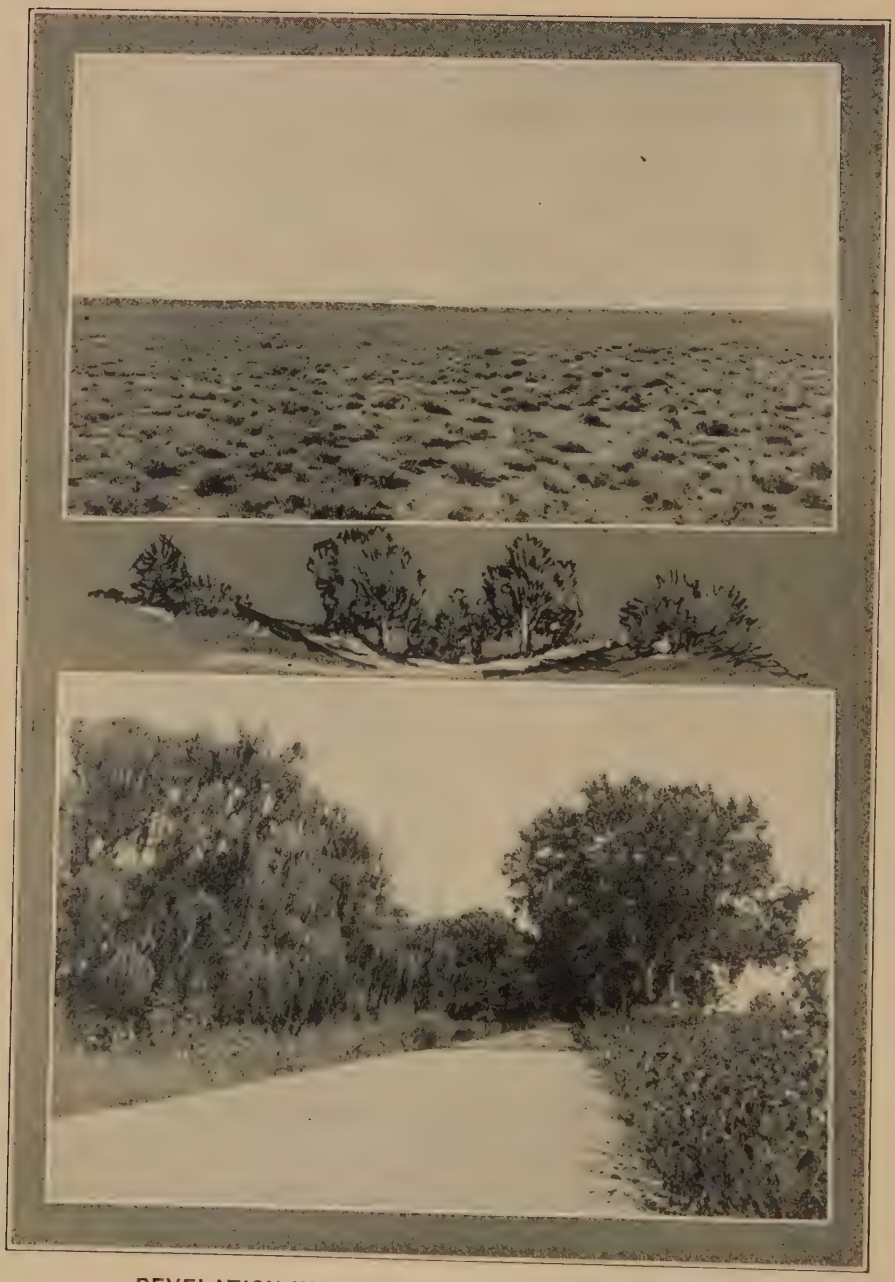
This very small, though interesting, zone includes only the few square miles that lie above timberline—elevations of 12,000 feet to 13,600 feet—on the highest peaks of the Sangre de Cristo Range.

The ptarmigan or white grouse is the only resident game on the barren peaks of this zone.

Waters suitable for such cold water fish as trout, occur in the Transition and Canadian Zones, extending down into the upper part of the Upper Sonoran Zone.

In the zones of higher elevations, as the Transition and Canadian, there is a more or less seasonal drift of game up or down the slopes from one zone to another, usually dependent on the snowfall, but the movement amounts to little in actual distances traveled.

Reclamation and other agricultural developments in many valleys of the State have resulted in the creation of conditions favorable to certain game birds, especially for quail and such exotic forms as pheasants. Such conditions, the result of man's interference, inject into the life zones an artificial element. In the lower Pecos Valley, as one of many examples, especially has there been a striking change as the result of reclamation. Before this valley was reclaimed, it was practically treeless; today it has a wealth of tree life. The reclaiming of this valley may have a favorable effect on the introduction of game birds. In recent years the borders and flood lands of the Pecos have become thickly set



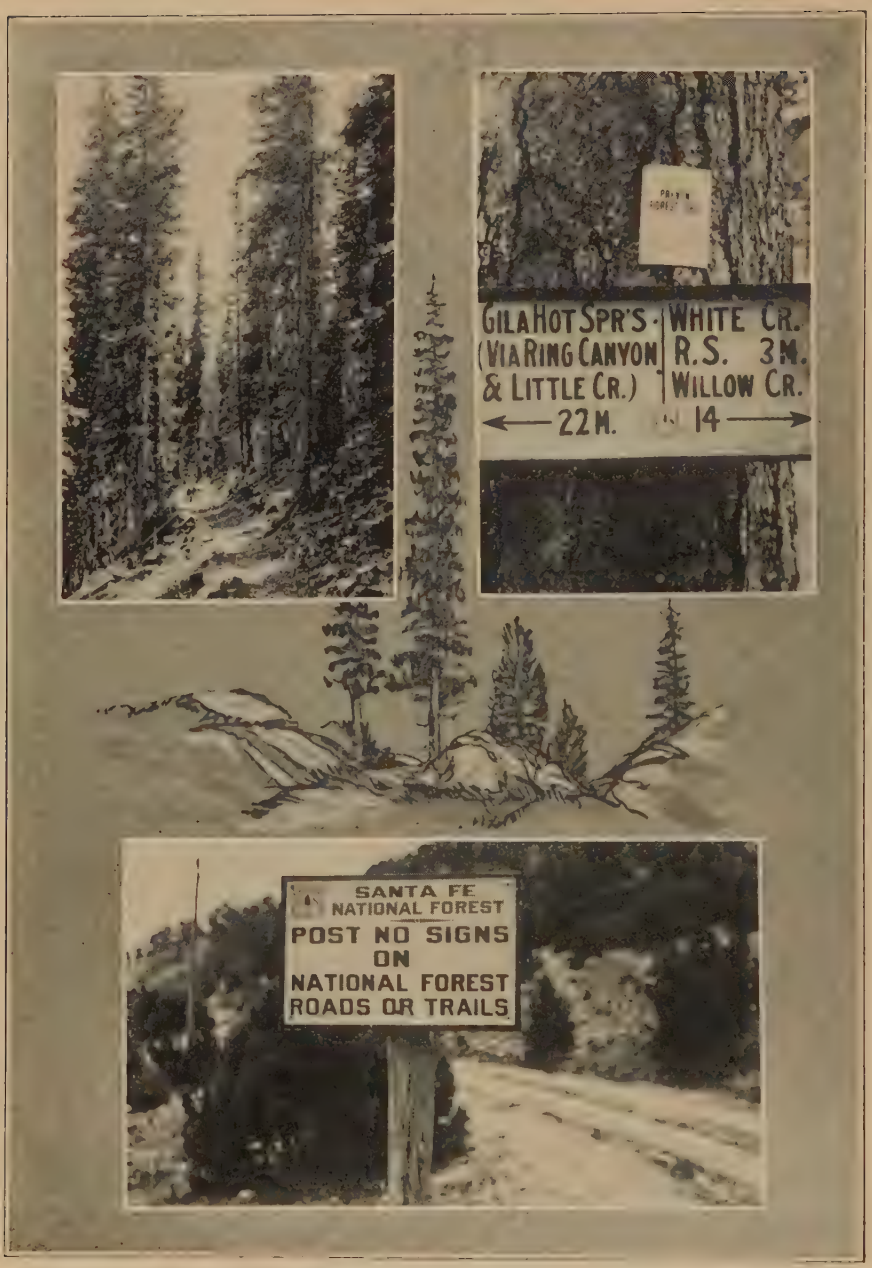
REVELATION IN THE RECLAMATION OF ARID LANDS

Upper: Pecos Valley type before reclamation.
Lower: Result of Reclamation.

with tamarisk or salt cedar which forms good cover and introduces a new and favorable environment for Gambel and bob-white quail, where formerly conditions were entirely unsuitable for them. If these game birds can be successfully maintained on this former wasteland, the desert will have changed to a bearer of another form of life.

BEST TYPE OF BIG GAME COUNTRY

Park lands and ridges of yellow pine, pinyon, juniper and live oak. Datil National Forest. (Note the band of grazing antelope in the distance).



MARKED ROADS AND TRAILS GUIDE THE TRAVELER THROUGH THE NATIONAL FORESTS

LAND UTILIZATION AND WILD LIFE

As an asset to the southwest, wild life in the future can be made equal to a stabilized livestock industry. It is one of the most valuable crops that can be produced; yet it has been and continues to be the most recklessly abused. For the same reason that the southwest is the leading year-around open range cattle and sheep country of the land, it is one of the best year-around game sections.

Our intensive economic activities, which have now reached the remotest parts of the land, have seriously complicated the conservation of wild game by creating abnormal conditions which, for the most part, are inimical to the welfare of wild life. Wild game cannot save itself from the conditions which have been thrust upon it anymore than can the forests save themselves under the devastation which has resulted in the wasting of timber resources. Nature, far superior to man as her own administrator, had no part in the abuse of her subjects; the white man alone is to blame and he must institute the reform.

Adventurous Americans always have had an inherent yearning for the wilderness and the wild game with which it teemed. This yearning has been a determining factor in our conquest and development of the continent. But today, as result of submission to monetary appeal and waste, we have almost deprived ourselves of this thrilling and character-building element. In the United States the last outposts of the wilderness have been reached and are on the verge of destruction. We no longer can eliminate the wild creatures in one area and push on to other fields untouched with the assurance of new thrills, as did the adventurous pioneers. With the dropping of the curtain on this last act of the drama of American conquest would vanish much of the charm of our country; a needed stimulus to robust manhood and our national supremacy would be threatened.

Perhaps the greatest enemy of wild life in the southwest today is not, as formerly, the man with the gun but, indirectly, man's domestic animals. There was a time, not so many years ago, when the livestock industry held full sway to the exclusion and ultimate detriment of all wild life. Today the value of wild life, the property of all the people, and of domestic animals, the property of the individual, is seeking a balance; and the welfare of both resources merits most careful consideration.

Those trail-blazers of southwestern civilization, the ranchmen, who as friend and citizen had no peer, did not realize that by overstocking virgin ranges they were so seriously impoverishing the land. The effects created by overgrazing are slow to manifest themselves. Often the ranges were deteriorated almost beyond repair before any serious consideration was given the matter. Free range, mild climate, year-around grazing and the ready markets all invited over-burdening of the ranges of the southwest, resulting in devastation and often starvation. Everywhere on the ranges bleaching bones, reminders of the lean years, proclaim this fact. The users of the range were their own enemies; they lived in the present

with no thought of the future. Failure was the penalty most of them ultimately paid.

While this unrestricted grazing has had its fatal effect on wild life, ranchmen here and there are due much credit for their early efforts to save game by checking unrestrained slaughter. Had it not been for the ranchmen, it is a practical certainty there would be no antelope in the State today. We are deeply indebted to the ranchmen, especially to the cattle raisers as game protectionists. They were the pioneers in a more or less effective game conservation movement in the southwest, and many of them today are the most ardent protectionists, and because many own the land, are in position to give protection where others are without opportunity.

But how are we to remedy most effectively conditions which have such an adverse effect on game and other resources? Through no other means than that which will also stabilize the livestock industry—grazing to reasonable carrying capacity of ranges. Only through conservative grazing can we hope to restore natural forage conditions—the requirements of all wild life. Native game makes no compromise; its demands are clearly defined, and, as a rule, its representatives do not take kindly to intensive civilization.

The extreme southwest, involving Western Texas, west of the Pecos, New Mexico and Arizona, has problems in wild life conservation which are peculiar to this region. Conservationists therefore cannot look, except in a general way, to older and better established states, with ample funds, to point the way to game conservation and increase in this region. Our problems must be determined and solved at home in accordance with local conditions.

The region in question is unique in that it is, for the most part, not only arid but much of it is of a rugged mountainous character. Unlike much of the country elsewhere, only a small percentage of this land supports a solid turf of grass, the prevailing grasses being of the loose bunch type; consequently such grasses under droughty conditions and excessive grazing are quickly cropped down and often killed out. This is not the extent of the damage created. Because of lack of solid turf, the soil is easily disturbed and subject to erosion by both water and wind. Nor is this the full extent of the damage. As the forage is eaten down, where domestic animals as well as game are abundant, important browse in the form of shrubs and other plants is actually killed. Practically everywhere cattle raisers complain that where formerly five cattle found ample food, today two or three with difficulty find sufficient to sustain life.

Unlike many range lands in more northern regions, the ranges of the southwest are favored with a mildness of the climate which permits grazing 365 days out of the year. This continuous utilization, coupled with aridity, is the cause of the periodic devastation of the land into the barren grounds of the southwest. In more northern climes, where winters are severe and long, and much of the country is not even suited for grazing domestic animals, only a limited number of such animals can be fed or cared for under artificial cover during the winter.

Naturally, this restricted number cannot seriously impair the extensive available summer range. Furthermore, in other good game states of the country, for example, Minnesota, Wisconsin, Michigan and the Atlantic Coast States, the rainfall is sufficient to insure luxuriant reproduction of forage and ample food, even where extensively grazed.

It is of interest to note, however, that most kinds of native game have persisted remarkably well in limited numbers over practically all of New Mexico in spite of persecution. The inaccessible type of country inhabited by many species, as mountain sheep and bear, is the only reason why more of them have not been totally exterminated in the State. But there is a greater decimation, especially among game birds and smaller game animals, and a far less increase than there should be, almost wholly because of lack of food and suitable ground cover for breeding purposes. Where luxuriant plant life formerly dominated plains, valleys and mountains, barren ground productive mostly of sand storms, erosion and starvation, is of too common occurrence.

Under the present advanced game policies in New Mexico and with the adequate system of refuges, game of the State is safe from extermination; but general increase in the supply depends largely on improved conditions of natural range forage and cover.

The value of fishing and hunting privileges automatically increases with the great increase in the number of hunters; but increased hunting does not necessarily increase the number of game animals killed. There is a growing interest in hunting and fishing for the sole pleasure of the experience, and with the increase of the army of hunters and fishermen, unless the available supply of game is materially increased, the percentage of those who are successful necessarily must decrease. The difficulty in getting to its harbors and retreats is a factor favoring game. Furthermore, the American people are becoming a nation of ease loving specialists and to hunt big game successfully is work—hard work—requiring skill, fortunately for the game.

As relates to fish, we are more fortunate, and can safely accede more fully to the wishes of the masses. Streams and other fishing waters can be entirely depleted of fish, and in a short time be artifically restored.

NATIONAL FORESTS, THE PLAYGROUND OF THE PEOPLE:

Fortunate is our nation to have produced men like Roosevelt, Pinchot and others, with vision, public spirit and determination who were working for the nation's future interests while the public was slumbering. Through their efforts nationally important forested lands were set aside when they were available to the Government. The potential wealth and recreational value of any state are immensely enhanced by National and State Forests, where the average man may still worship in the temples of nature. The states which are favored with a liberal acreage of such forests or those that can yet acquire them are in a position to con-

tribute to the health and happiness of their citizens of today and tomorrow. The value of the National Forests is manifold; it has only begun to manifest itself.

In retaining the National Forests at their highest values and purposes for all the people for all time, the U. S. Forest Service needs and must have the strongest public support. These forests are the property of all the people and should always be available for their benefit and pleasure. As time passes the demands on the National Forests will unavoidably become greater. Safeguards will be necessary to curb selfish interests and in the taking of necessary precautionary measures, the Forest Service must have the active and moral support of the people for the benefit of the public good. The arrival and development of an age of special privileges obtained through influence and wealth serve to impress upon us the increasing need of retaining our National Forests entirely free from exclusive privileges. They must serve as the nation's conservation storehouses and as the democratic recreational grounds of the land.

The increased interest being manifested in the development of game and fish production on privately owned land is merely the embryonic stage of a general tendency which will relieve pressure on the public hunting and fishing grounds in the National Forests. Demand makes this inevitable. In New Mexico there are extensive holdings, great areas of early Spanish land grants that have been handed down from generation to generation until they have fallen into the hands, for the most part, of wealthy individuals who see the future value of game and feature the game as an asset on such lands. This phase of land use is in the making and should be liberally supported and encouraged by the Game Department and State game organizations. It will relieve the tax on the National Forests, the average man's sole hunting, fishing and recreational grounds.

THE MAN WHO OWNS THE LAND:

The right to property is inalienable. When this principle is questioned, the entire structure of American civilization is shaken. In hunting and killing game, the man who owns the land must be taken into consideration; the Constitution of the State and the United States insures this consideration.

Strife and jealousy are often displayed on the part of a certain element toward the land owner who conserves and protects game on his land. Such feeling is usually without reason. If we are fair in our convictions, we must generally admit that the land owner who now has game in quantities has it because he saved such game from inevitable extermination at the hands of the public when game laws on the big outside were little regarded.

The hunting of game on privately owned land as well as elsewhere, unless conducted with discretion and judgment, is disturbing and destructive not only to game but to domestic animals and other personal property as well. As a rule, the right-minded sportsman is on good terms with land owners here and there and enjoys hunting and fishing privileges. But, unfortunately, there is a certain class of hunters and killers who feel that no restrictions should be placed about their

activities when once they get into hunting territory. Against such the land owner must have the right to protect himself. So long as this class tears down fences, shoots stock and kills the land owner's pet quail, antelope or deer, they can expect trouble. Fortunately, such outlaws are rapidly being alienated by sportsmen and in the future lack of places for them to operate will reform or eliminate them.

Land owners who are sufficiently interested to use their own money in protecting game by killing off predatory animals, in reintroducing exterminated species and experimenting with exotic forms, in planting food for game or otherwise aiding wild life conservation should be encouraged rather than imposed upon. There need be no fear of game becoming over-abundant on such privately owned lands; someone gets the benefit from hunting inside or from the overflow on the outside, thus lessening the tax on the supply elsewhere.

The value of protecting privately owned lands of easy access against game extermination already has been apparent in New Mexico. Such lands, as already stated, were protected when there was less respect for game laws generally than is the case today. The result was that game often was killed out on the public domain or on adjacent unprotected private holdings. Hunters were not long in learning that the best hunting was adjacent to these protected areas and flocked there to get their deer and turkeys.

Cooperation among land owners—farmers and ranchmen—and sportsmen, therefore, is imperative for the best interests of all concerned. The sportsmen must recognize and respect the interests and rights of the farmer and ranchman or experience the inevitable exclusion from his holdings. It is preposterous to think that the army of hunters that go forth in the fall can all be admitted to accessible private holdings where game is protected.

The land owner is not always blameless. Often the game laws are disregarded by him, or influential friends are given privileges that should not be accorded. The land owner should respect any protection extended to him by laws and should abide by their provisions; otherwise the public may disregard his rights and even laws may be enacted that would prove detrimental to his interests.

One of the most common law evasions of which some holders of extensive lands are guilty is the permitting of non-residents to hunt on resident license or, worse still, without any license. Evading game laws in this manner is as serious a crime against law as any other violation and the violators should be penalized accordingly. Any patriotic and self-respecting American citizen should now be only too glad to contribute the nominal sum the law requires for the privilege of killing game; if for no other reason than to do his part toward promoting its maintenance.

LAND CLASSIFICATION:

New economic and social conditions require sound, progressive policies in the use of every resource. Valuation of lands in the State should be based not on present returns alone; future productiveness must be taken into consideration.

OVERGRAZING IS DETRIMENTAL TO DOMESTIC ANIMALS AS WELL AS GAME

Upper: Undeveloped cattle as result of range abuse.
Lower: Well conserved range in high altitude. Colfax County

Fortunately, lands on the National Forests are already undergoing exhaustive studies and careful classification; but the vast amount of public domain and State owned lands has received little consideration in this respect. While it is improbable that far-reaching good would result from any attempt to classify individually owned lands, State and Federally owned lands should be subject to careful supervision based on classification by competent unbiased Federal and State officials.

The vital factor which should govern the use of New Mexico's public lands, including the National Forests, is its greatest value to the public after all its potential uses have been considered. Once lands have been appraised on this basis, they should be utilized accordingly and to the best interests of the individual, State and nation.

Forage conditions on the millions of acres of strictly range lands in New Mexico are today much improved compared to the devastation and wreckage that prevailed during the last four years. These improved conditions, however, will be of little permanent benefit unless sane policies of land utilization are adopted.

It is significant to note that the collapse of ranges and of the cattle industry in New Mexico, between 1920 and 1925, was accompanied by a great decrease in numbers among all species of valuable wild life. This is ample proof that when the land becomes barren, the way is open for game extermination, even though the huntsman foregoes his pleasure afield.

Only by respecting the physical limitation of arid land productiveness can any stable land values be established. Lands best suited to reasonable grazing of domestic animals should be so utilized. Areas of vital importance as watersheds or parks and for wild life should not be grazed at all, while lands not suited to agriculture should never have a plowshare driven through the soil. Naturally, the individual who has only a temporary interest in the land, as has been true of utilization of public lands in the past, and desires to squeeze from it all possbile monetary return in the shortest time, is not fitted to pass on its higher and permanent value.

Nothing appears to have hindered progress in the southwest more nor stagnated economic stability, directly or indirectly, as much as the inflation of land values. So long as wild speculation continues in lands that have only very low grazing value, no economically sound land valuation policies can be established, and natural resources will continue to suffer.

If conservationists, sportsmen and other recreation seekers desire to continue to have natural beauty, game and fish; the farmer and manufacturer to have better regulated stream flow for irrigation and power; and if the urban and rural communities along the minor and major watercourses of the land would be relieved of the ever-increasing flood menace, then these mutually interested elements must set themselves to the task of restoring and conserving forests and plant life by means of which the surface of the earth and its natural products may be properly conserved.

New Mexico is aptly termed the "Sunshine State." Her divine gift of almost perpetual sunshine is highly featured; yet, in contradiction, as dwellers of the arid southwest, we are often affected with chronic complaint against the highest virtue of the climate,—its aridity. Were it within the power of mortal selfish man to transform the climate, he probably would do a great injustice not only to afflicted humanity that seeks its curative qualities, but to all endemic plant and animal life that Nature has so highly endowed to meet the conditions that make the southwest unique and impart to it a charm and interest for which everyone appreciative has a proud but reserved love and admiration.

DIAMOND CREEK CANYON, BLACK RANGE

Can be reached only by route of picturesque pack-trails.

MONETARY AND OTHER VALUES OF WILD LIFE

During the pioneer days American wild life had its greatest value as a source of food and clothing; but today this value is subordinated. The food value and skin value remain, but not as necessities. Today the worth of game is considered more from the recreational point of view and as a means of giving men an opportunity to build up their health and strength in the open.

A trout has a far greater value to the sportsman or other recreation seeker than its hunger satisfying potency. A deer or turkey is no longer sought by the true sportsman wholly for its food value nor to satiate the lust to kill. The higher value placed on game today by conservationists is a product of a highly developed civilization. This new and commendable order of the white man's relation to the mountains, forests and plains and to the remaining wild creatures that inhabit them, invests them with a new and rising value aside from monetary consideration.

The recreational and not the monetary value is the most equitable rating by which we can judge our wild life. By such a rating, our wild creatures become of untold value. If the presence and perpetuation of wild life can be made to further increase happiness and the physical welfare of people, it then will become an asset of paramount importance.

As a matter of fact, in the aggregate, huge sums of money and endless time are annually consumed in America merely to see wild life in its natural environment. Our great Yellowstone Park is an example. The bears and other big game there are becoming the greatest attractions of this nature lover's mecca. The interest and thrills attached to seeing this big game living contentedly in its natural home leave a lasting impression. The animals are the subjects of many interesting conversations long after many of the other details of the trip are forgotten. That New Mexico does not benefit more by such attractions is because she does not provide them for the interested public.

Wild life is so clearly a part of Outdoor America today that were it eliminated the charms of the open would soon become prosaic. If only the food value of deer and turkeys were the consideration in New Mexico, it is not probable that protective laws would longer be needed; or if fish were sought merely to satisfy hunger, the streams would soon become burdened with trout. The stage where the fisherman plays his game and the mental attitude displayed in the stalking of wary, antlered monarchs are values far above monetary rating.

The expense that hunters incur in getting their game might be considered a tangible basis for figuring its value. In order to arrive at the monetary value of game and fish of the State from this point of view, several items of expense must be taken into account and credited to its value. These would include the

cost of getting into and out of the game country, value of time while on such trips, money invested in hunting and fishing licenses, food and trophy value of game secured, to say nothing of the thousands of dollars annually invested by sportsmen in equipment. When we appraise our present scanty numbers of game animals and fish on this basis, we begin to appreciate the value that a liberal supply would be to the State. While the valuation of game generally is placed on the annual surplus that is obtained by hunters, we must remember that the reserve stock also has its value, just as the ranchman places a value on his reserve breeding stock.

The proportionate cost of getting fish in New Mexico is even greater than that of getting big game, unless we place a higher valuation on the recreational phase of fishing. That every dollar's worth of fish caught in New Mexico by fishermen has brought an expenditure of ten dollars in the State would be a conservative estimate.

A fisherman on the head of the Pecos, who had come from a distant city, stated that he had spent over two hundred dollars in getting to the New Mexico fishing streams and if he succeeded in landing four trout, he would feel amply rewarded.

The visitor or non-resident usually pays well for any fishing privileges and, as a rule, his success is not comparable to that of the resident fisherman who knows the streams and how to get the fish.

The actual value of game and fish in New Mexico is now high and if we were to restore them to their potential abundance, their presence would no doubt be one of the most valuable assets the State would possess. Wild life often gives value to vast areas otherwise of scanty productiveness.

OBSTACLES CONFRONTING WILD LIFE CONSERVATION

The object of this report is to help wild game, not the hunter who already has far too much the advantage in skill and deadly equipment.

The three major obstacles confronting wild life in New Mexico—law violation, predatory animals and lack of natural ground cover—all seriously militate against the attainment of game increase. Practically every adverse element that affects our wild life emanates from one or more of these sources. The fourth serious obstacle until recently—politics—apparently has been eliminated and the sportsmen of New Mexico today are obtaining not only full recognition but cooperation from State political leaders.

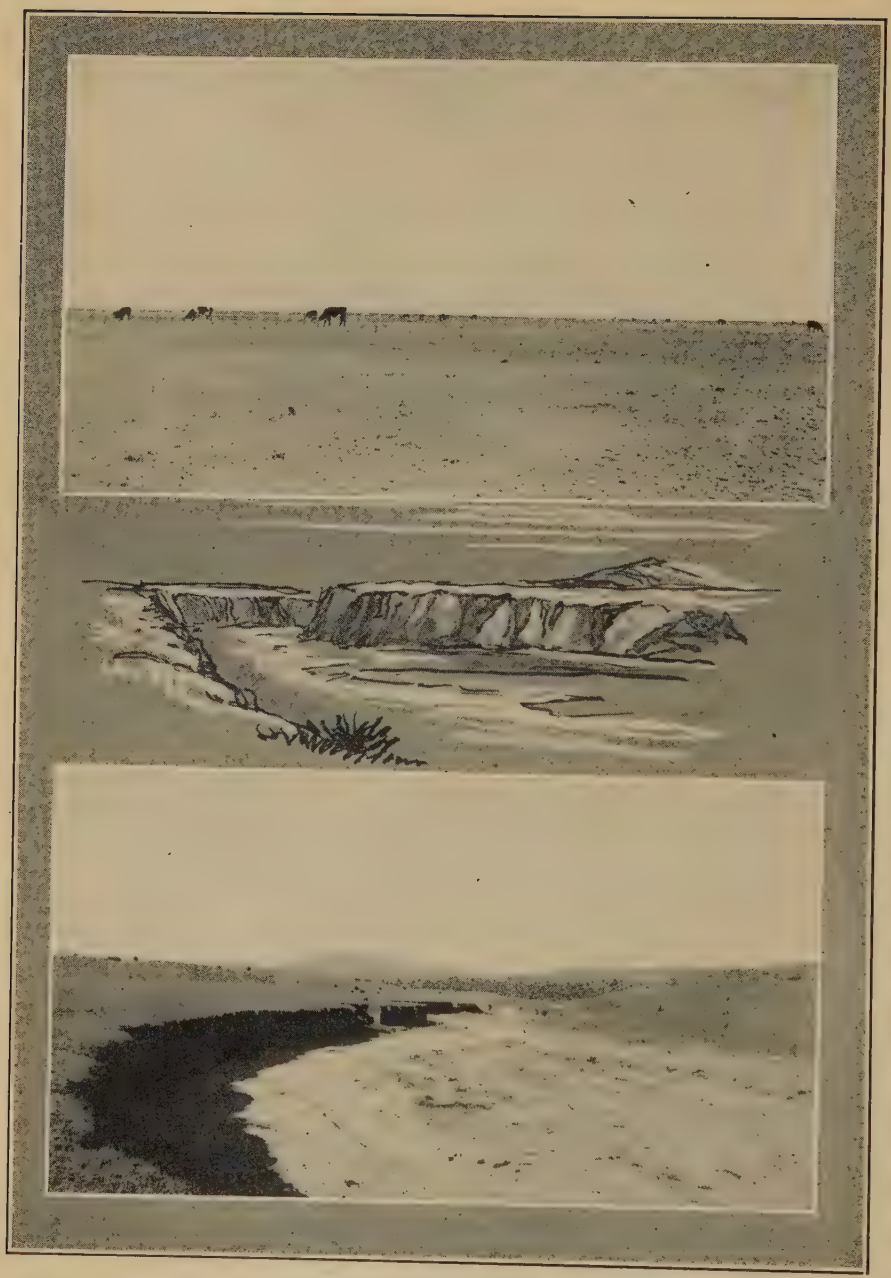
While we are concerned in maintaining our present supply of game which, although inadequate, is safe against being exhausted, we are more concerned in the problem of producing a big annual increase. Hence under this heading the principal and most direct means of bringing about such an increase are considered.

ABUSE OF RANGE FORAGE AND WATERSHEDS:

The importance of restoring and protecting natural forage and ground cover, as grass, weeds and shrubs, throughout the State, cannot be too strongly emphasized. Without this protection there is no possibility of an adequate, stable game supply. The proper functioning of watersheds and springs and stream flow are all dependent on the plant life that normally clothes the earth. Without this cover, the water is not sufficiently absorbed by the ground but is permitted to run off in torrents and floods which cause serious erosion. The longer this situation is permitted to exist, the more serious it will become.

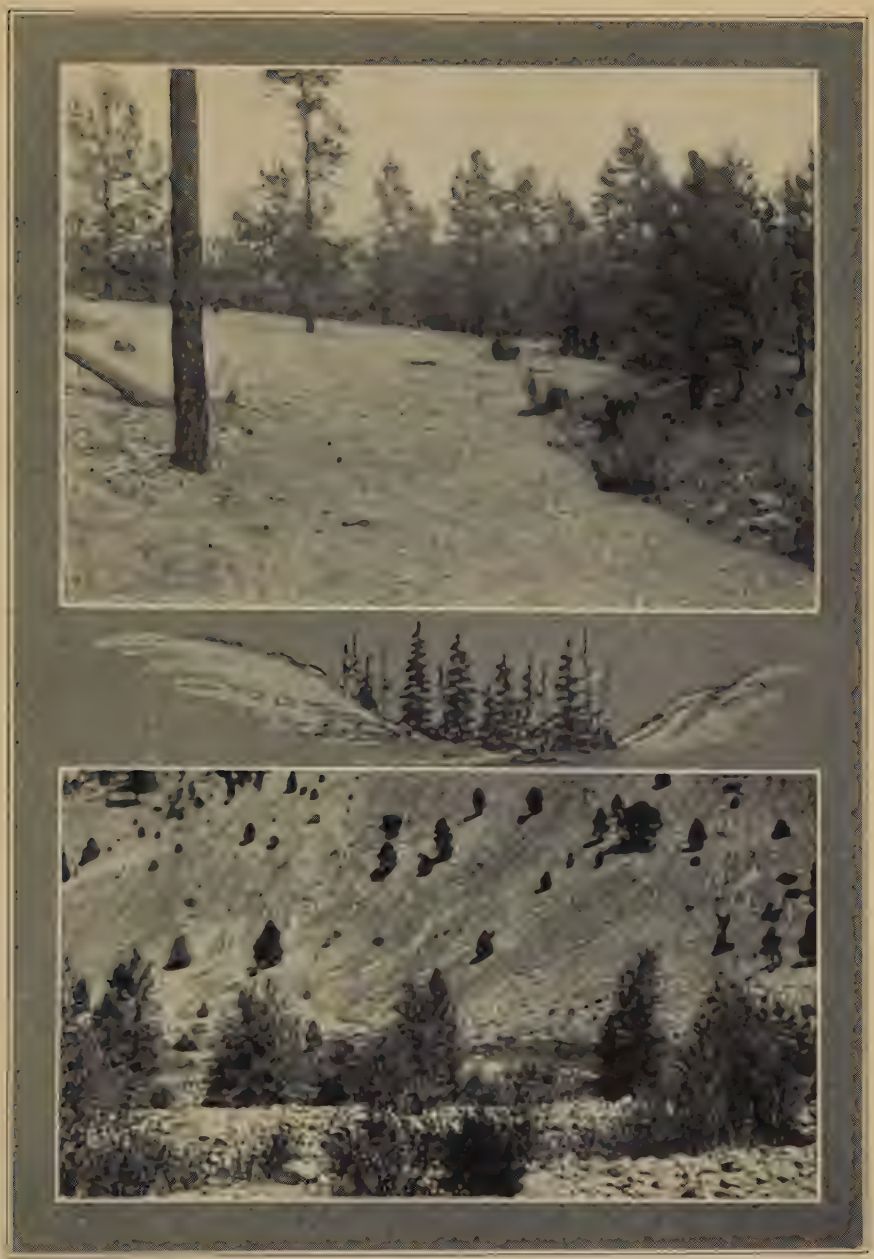
Barren hills, plains and valleys are of such common occurrence that we are apt to accept them as a natural state of existence. Yet if range forage were given an opportunity to recuperate and reestablish and maintain itself, the beauty and carrying capacity of ranges and general conserving power of Nature would be increased manifold. In recent years ranchmen have been complaining about the country becoming more arid and contending there has not been as much rainfall as formerly, while in truth on an average, over a period of years, the amount of moisture has been about the same, but the denuded ranges can no longer withstand abuse. The intensified drought troubles emanate mainly from land abuse. Man alone is at fault and not the elements. In former times grass and other range forage were so luxuriant that users thought it inexhaustible. Fat cattle were then shipped from range to market; today feeding must be periodically resorted to to stave off starvation.

To say that abuse of range lands does not conflict with reclamation, agriculture, and conservation, is to disregard a very serious situation. It is an inexor-



Upper: *Staked Plains, formerly the finest grass lands in the state denuded by excessive grazing*

Lower: *Valley erosion resulting from continued barren condition of the ground. Foothills of the Black Range*



NATURE CANNOT FULLY RECLAIM DESOLATE MOUNTAIN SIDES AFTER THE SCANTY SOIL DEPOSIT HAS BEEN WRESTED FROM THEM

Upper: Soil gone, stone and gravel of the canyon slopes are overspreading the timbered bottoms. Black Range

Lower: Mountainside and canyon erosion, result of long range abuse; but under more recent protection plant life has begun to get a foothold. Santa Fe Canyon

able fact, one that cannot longer be ignored. The longer this situation is ignored, the more difficult will be improvement and restoration.

The effect created by overgrazing of timbered lands and watersheds has not by any means been the limit of such damage. All of the public domain and privately owned lands in the arid, year-around grazing empire has been equally affected. In remedying the situation on such land over which the State or Government at present exerts no control as regards grazing, we are confronted with the most serious obstacles. Fortunately, most of the high mountainous areas are in the National Forests and since these belong to the people, their supervision is subject to the will of the people and not to selfish desires of a few individuals.

The fact that there is at present no supervision over utilization of the public domain or Federally owned lands, comprising more than 16,000,000 acres or 20.70 per cent of the State's total area, seems to demand that the Federal Government administer such lands for the benefit of the public. Under a properly administered grazing plan there could be extended protection to game over this vast domain without encumbering the land for other profitable uses for which it might be suited.

Much of New Mexico is not, and probably never will be used economically for anything but grazing. Much of the public range land was homesteaded, its best crop—the grass—plowed up, and then crops failing, was deserted. During this pioneering stage, the greater part of the game was exterminated as well. To talk of eliminating grazing from the extensive prairie and valley areas of the State is folly; but for the good of all concerned, grazing should be restricted to carrying capacity of ranges.

Carrying capacity of ranges is far from consistent. Each section must be considered independently and on its merits. To determine best utilization of various types, careful classification is necessary.

In the collapse of range forage, the wild life of New Mexico including fish, has suffered its greatest reverses, and not until the natural vegetation has been permitted to normally reestablish itself, need we expect material and lasting increase in our game supply.

The absence of an adequate supply of plant life seriously affects wild life: (1), by depriving it of necessary food; (2), by exposing it to its many enemies—including ravages of the elements—some of which under natural conditions could hardly be considered enemies; (3), by depriving it of cover under which to raise its young. Game birds cannot raise their young on barren open ground; nor are they apt even to attempt nesting unless conditions are favorable for hatching and raising their young. Even where hatched, they are not long in evidence without the protection which Nature normally provides.

Destruction of ground cover and tree life along watercourses also is fatal to the welfare of song and insectivorous birds. If suitable breeding places and cover are not available for such birds, they do not nest, and in time their numbers are greatly depleted. Such decimation is dangerous because few people observe it and not many realize the cause.

RESULT OF YEARS OF RANGE FORAGE ABUSE

Upper: *Overgrazed wooded type, near West Fork of Middle Gila River*
Lower: *A comparison. Effect of no protection and partial protection. Middle Gila River bottom. (Photos taken in late fall)*

While with larger game animals local conditions may not so seriously affect birth rate of young as among the smaller kinds, unfavorable cover and food increase the mortality among the young because of lack of nourishment and exposure to enemies. Close observation will reveal that antelope and deer retire to areas of rank grass or brush in secluded places to have their young so as to conceal the helpless offspring until they become active and strong enough to protect themselves by flight. Where the cover has been removed they cannot conceal them. When the ground is barren, coyotes, wildcats and other enemies become doubly destructive since the finding of their prey is then an easy matter.

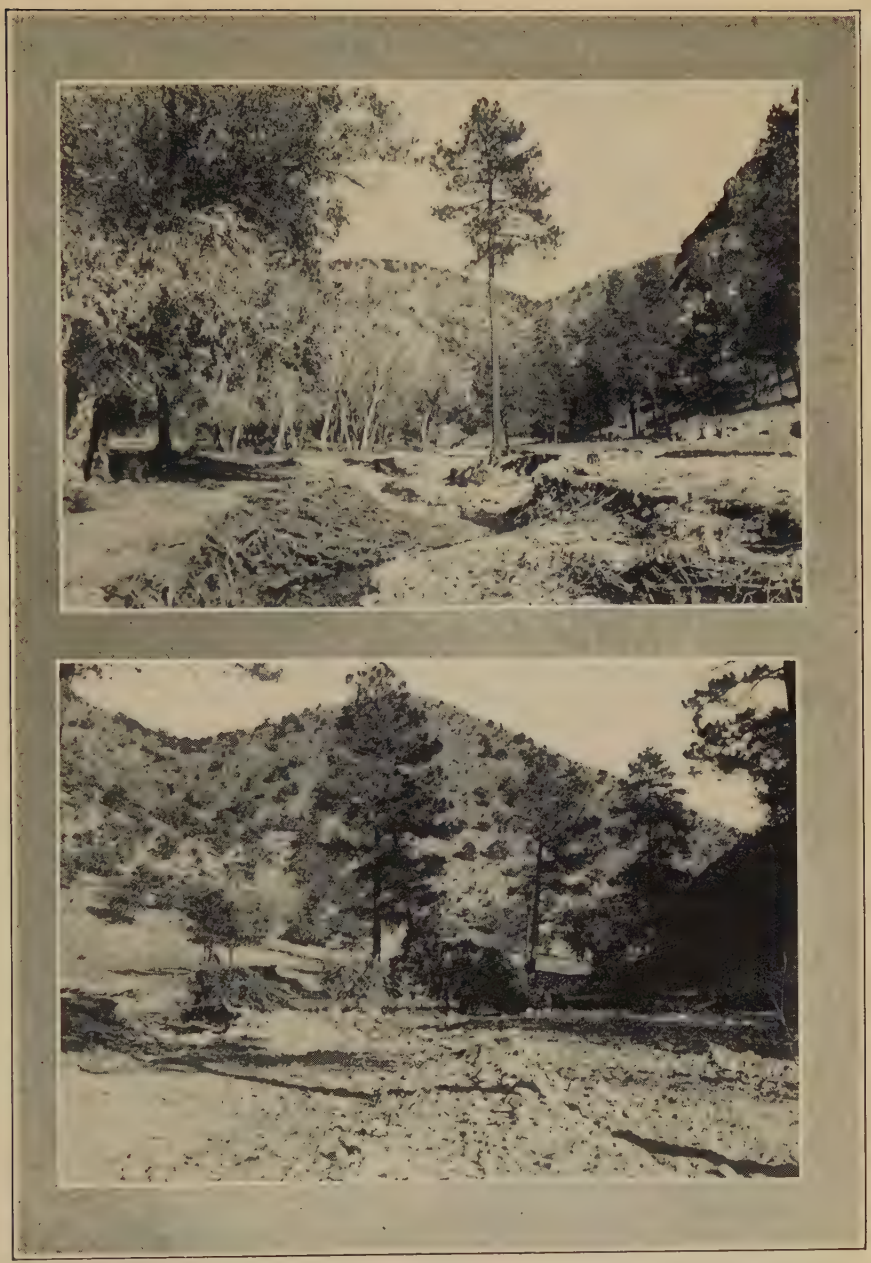
In former times big game practiced rotation grazing—grazing certain types of range in winter and others in summer—but in more recent years such game has been forced to modify its habits; and because of timidity and man's obstructions, as towns, railway lines and fences, it is now usually resident throughout the year where found.

Cold water fish and fishing streams are as seriously affected by overgrazed watersheds as is game. Not only do the extremes of low and high water, caused by floods and erosion, affect the normal flow and temperature of waters, but the destruction of willows, alders, weeds and grasses eliminates both food and shelter for cold water fish. No experienced angler fishes in sun-exposed streams where the water spreads shallow in unprotected flood-ravished watercourses; he seeks the cool shadows where the alders, willows or conifers overhang the banks, where the stream is narrow and banks with matted roots are secure against erosion. But, alas, such spots are not numerous along New Mexico's cold water streams today. Abuse by overgrazing of watersheds and watercourses, as no other cause, has deteriorated New Mexico's fishing.

One of the secrets of reestablishing wild game animals and cold water fish in New Mexico lies first in the reestablishment of conditions conducive to the existence of such wild life. These conditions are entirely dependent on sanely restricted grazing policies in our National Forests and in other mountainous areas. Restricted grazing is of the most vital importance to conservation of natural resources in the year-around grazing districts of the southwest. Any readjustment in future grazing policies must take into consideration the welfare of wild life.

Any domesticated animals on the higher and more precipitous mountainous districts and principal mountain watercourses are too many, and the sooner the sportsmen and conservationists realize this fact, the sooner will be served the interests of the State and nation.

There is no doubt that unless the ranchmen make some concessions along this line, the increasing multitudes who each year turn to the outdoors for their recreation or those who rely on proper functioning of watercourses to supply water for agricultural lands, will not only demand but will, through coercion, obtain many more concessions than would be necessary to satisfy them were such considerations granted voluntarily. It would, therefore, behoove the livestock interests to cooperate willingly in this respect.



WRECKAGE OF CHLORIDE CREEK—RESULT OF MOUNTAIN FORAGE DEVASTATION

Upper: Ever-increasing floods eat away more soil and undermine the trees
Lower: The rich soil gone, leaving stones, gravel and uprooted trees.

The matter of determining the extent of grazing on Federally or State owned watersheds should be left to experienced and unbiased judges. Local conditions would necessarily have to be taken into account; however, as a general rule, the more precipitous mountainous areas and peaks would fall in the restricted class. As a rule, it might be a good policy to restrict or preclude grazing of domestic animals on areas above a specified elevation, although a rule of this nature could not consistently be made a binding one, as to adhere strictly to such a rule would mean the withdrawal of some of the best summer grazing areas in the State. Elevated grass lands, therefore, should not be confused with rugged mountains which constitute the reservoirs of the principal watercourses.

The Black Range and Mogollon Mountains, two of the finest natural game regions of the Southwest, are glaring examples of the effects of overgrazed watersheds and the consequent effect of erosion. In these mountains, springs are becoming weaker from year to year, many having entirely disappeared. The water levels of the streams are falling and the canyons and watercourses are filling up at a tremendous rate with gravel and boulders. At the same time, the mountain and canyon sides are being cut, carved and torn down at an ever increasing rate. Many canyons that formerly contained clear, running streams are now filled with debris and wreckage and are converted into raging, devastating torrents with every rain. As an example, Chloride Creek used to be filled with willows and other shrubs and a clear, constant stream of water meandered between its enchanted walls. Travel for twelve miles up its course from Chloride was not difficult by use of wagon; but in recent years because of continuous overgrazing, practically all brush and other small plant life have disappeared. Water, for the most part, is absent or runs beneath the gravel. Today after each flood the canyon is impassable for vehicles. This serious situation has come about within the last few years and is becoming more evident each year.

What has occurred in Chloride Canyon is the history of every mountain watercourse in the southern section of the State. Palomas, Seco, Animas and other drainage systems along the east slope of the Black Range have contributed to the tearing down process and abnormal drainage of this charming mountain system. And this is not the extent of the wreckage. As the turbulent waters move downward, they destroy crops and wash away the rich soil from the pent up farms in the canyon paths of the streams. The aggregate flow often unites to swell the Rio Grande into a devastating flood.

When the Elephant Butte Dam was built it was generally believed that the impounding of water in this mighty reservoir would largely eliminate danger of floods in southern New Mexico and western Texas. Yet in 1925 there occurred in these sections the most disasterous floods experienced in years, caused by rapid runoff of rain water along the eastern slope of the Black Range and from the canyons that drain less important mountainous areas south of the Elephant Butte Reservoir.

This situation is amendable only to the protection of watersheds from exces-

sive grazing. While it is true that the present barren, eroded condition of the Black Range and other southern mountainous areas is a cumulative condition—the result of many years of abuse—the crisis has nevertheless been reached and the situation seems to demand an answer to the question: "What are you going to do about it?"

The southern two-thirds of the State has all suffered the same fate from range abuse. The northern one-third consisting of the Jemez Mountains, and northward, and the Sangre de Cristo Range, north and east of Santa Fe, has not suffered quite the fate of ranges farther south. These northern ranges are more of the Colorado type, being higher and therefore receiving more moisture than does the southern area, and for the most part are grazed only during the summer season. Even in these more lofty mountains, however, the lower reaches of the watercourses have suffered seriously from ravages of domestic animals.

I became familiar with Western Texas—The Trans-Pecos country, as well as the famous Devils River country, east of the Pecos—when the vast ranges were in virgin condition. Quail, (bob-white, scaled and Mearns) swarmed over this natural game territory in incredulous numbers. By 1910 the entire region had been occupied by droves of cattle and sheep, the peerless native forage cropped to the ground and the quail almost exterminated. Practically speaking, the hunter was not a factor in this wide-spread decimation. Big game was also abundant but when conditions suited to it became impaired it, too, soon disappeared even where little hunted.

Today bob-white and Mearns quail are almost exterminated from this empire, and the abundance or scarcity of the hardy scaled or blue quail is governed almost entirely by local conditions of ground cover. Often the cattle and sheep on these ranges must be fed or moved to more favored ranges to prevent starvation. Such conditions can not be attributed to drought so much as to lack of proper range management. We cannot charge the elements with man's follies, neither can we change the climate; but we can show discretion by using range lands in accordance with their carrying capacity.

Protection of forests against fire is a household word throughout America, while protection of watersheds and other open range lands from overgrazing is a subject foreign to the masses. Yet in the mountainous areas of the southwest, abuse of watersheds by unrestricted grazing has been even more serious in effect than fire. Fire destroys only the surface covering; it does not disturb the scant mountain soil as do domesticated animals by their plowing hoofs. This soil is the vital life of the mountains, and when it starts on its way to the sea or to fill irrigation reservoirs, leaving rocks, gravel and other debris in its wake, damage is being done which man cannot repair. Soil that Nature has been thousands of years building up is torn down through man's indiscretion in a few short years. Nature, if given an opportunity, reestablishes timber, grass and other ground covering after a fire, but she cannot reclaim desolate mountain sides after the scanty soil deposit has been wrested from them.

No agency appreciates this situation more than does the United States Forest Service; but without the support of public sentiment, their accomplishments are attended by stubborn opposition from selfish individuals who are concerned largely in their immediate monetary gains. The public, which is the loser, is slowly beginning to appreciate the seriousness of the situation, as pertains to abuse of our forest lands. As already stated, if the users do not voluntarily conserve forage on the forests, public domain and state lands in the arid southwest, the Federal Government and States should take a hand in the matter. Such reasoning is not radical; it is based on the interests of the general public as well as on that of the individual user who disregards the immutable laws of Nature.

Game is not so seriously affected by drought so long as the ground has a liberal covering and likewise drought is never so serious in effect when the ground has a liberal share of its protective covering. To verify this statement we need only to compare right-of-ways of railway lines that span the southwest or the study plots which are maintained by the Forest Service with the unprotected surrounding range. When the ground once becomes barren in the arid lands, rainfall that under normal conditions would increase forage, has little or no effect; young plant life needs the protection the matured vegetation gives it. The perplexing problem lies in the fact that when drought does occur with ranges stocked with domestic animals to capacity for good seasons, starvation is inevitable with continued drought. In stocking the ranges, the dry years must be taken into account.

New factors are being brought into the livestock industry which offer encouragement to conservationists. The increased cost of production of cattle and sheep and expensive blooded stock make it imperative that losses be held to a minimum. Hence the progressive cattle or sheep raiser in the future should not be so prone to overstock his ranges—he should take into consideration the inevitable years of drought. Range land values must be kept down to a level whereby moderate grazing may continue to be profitable. Any effort at super-production on the arid ranges can terminate but one way, namely, in financial failure and barren lands incapable of producing anything. The years of poverty that mark the trail of the cattle industry give testimony to this fact. Over-production has had an unfavorable effect on the prices of cattle. The deflated prices resulted in overstocking of ranges, excessive numbers of cattle being held for better prices. Grazing only to carrying capacity of the range would lessen danger of over-production, minimize losses through starvation, and would have a tendency to stabilize the livestock market. This remedy, however, would not repair damage which is being done by animals collecting on the main watercourses. Canyon watercourses along which congested numbers of cattle ravage every vestige of plant life are amendable to protection only by keeping the animals out of them. Until this is done, there will be no material improvement in conditions on such watercourses for animals, birds or cold water fish.

The brush, weeds and grasses which formerly protected and ornamented the

REVELATION OF NATURE'S RESTORING ABILITY

Upper: East Gila River, looking up stream where range cattle have full freedom
Lower: Photograph taken from same spot, but down stream. Fenced against cattle

watercourses and even dry drainage courses and valley lands now are rarely evident in the arid southwest, so closely cropped are they, except locally where fenced and protected for agricultural and other purposes. Even these few favored spots, as a rule, are only partially protected, being heavily grazed in winter.

The effect of protecting small shoestring areas along mountain watercourses, in comparison with the denuded surroundings, is amazing to the appreciative conservationists. There are sufficient of such favored spots throughout the State, even now, for us to apply the example and make comparison.

The gorge of the East Gila River is the most conspicuous example of the effect of devastation and protection to be found in the entire State.

In October, 1926, I went down the Gila River on horseback in order to make close observation, from the headwaters of the East Fork at the junction of Taylor and Haut Creeks, to the confluence of this stream with the middle and west prongs, where the main stream "boxes" to escape to the lower desert lands through imposing gorges that cleave one of the most rugged mountain fastnesses of the land. The distance by the devious course of the stream between the two points mentioned is about 45 miles. Because of the water, the head of the stream, and the first five miles of its course, are a congregating ground for all the cattle within reach. Nothing but large trees, boulders and gravel has weathered the ravages during the years of occupation by domestic animals.

But when I reached the first homestead—six miles below the starting point—where for a half mile the river bottom is fenced, cattle being practically excluded, I found a revelation of Nature's healing processes and recuperating ability. Above the fence was the usual barren gravel-strewn canyon bottom, 200 to 300 yards between walls, with the sprawling sun-stricken stream lazily winding its way. Below the fence, in sharp contrast, was a veritable jungle of luxuriant young cottonwoods, willows, alders, weeds and grasses in crowded profusion and the stream almost hidden in the shadows. Upon investigation I discovered two beaver dams with thriving colonies that had carefully impounded considerable backwater which was flooding and irrigating the bottom lands well out on the flanks. In the upper end of the enclosure a flock of wild turkeys were intently feeding on the seeded grasses while scattered about between the upper and lower fences were great numbers of Gambel quail. The little jungle was teeming with proof of its value.

I passed on into the barren and almost lifeless gorge where here and there a cottonwood, walnut or other tree in contrast accentuated it barrenness. Few or no young trees were in evidence. The only life in the sun-exposed stream was swarms of suckers. For ten miles this unproductiveness prevailed; then another fenced shoestring area, a mile long was encountered. Here a few small corn patches on the isolated tillable spots dotted the bottom. The same profusion of young tree growth, grapevines clinging to trees, and rank weeds and grasses, all in rich fruiting predominated. Along the creek were beaver dams and the accompanying deep holes of clear, impounded water, with peace and plenty for the occupants. Everywhere Gambel quail were calling and sporting. The owner informed me

CONSERVING THE LITTLE STREAM JUNGLES—EAST GILA RIVER

Upper: Cultivated ground surrounded by brush, weeds and grass. A Gambel Quail retreat

Lower: Where beaver and other wild life find an ideal environment

that there were no less than five hundred of these quail and also many of the Mearns species on his place.

I reluctantly passed on down through another stretch of the gorge almost devoid of life and without sign of beaver or quail, until many miles down near the junction of the East Fork and its relatives, the West and Middle prongs, I reached the X S X headquarter ranch. Here again were protected cultivated spots with young trees and plant life, comprising a half mile segment of the river, with many Gambel quail and evidence of beaver.

In summarizing these extremes some interesting results manifest themselves. Out of the 45 miles of river gorge, the two miles of partially protected bottom lands contained no less than 1,000 Gambel quail and perhaps 50 beaver. The balance of the river which is exposed to cattle, supported none of either, so far as I could ascertain. What the 45 miles would produce in quail and beaver, to say nothing of fish and other game, if protected—with watering gaps here and there for cattle—is not a matter of postulation, although the results may seem almost too encouraging to be true. How would the many sportsmen who now flock to this attractive region feel if they could find 45 miles of quail as thick as they were on the two miles described? Or what could the State expect as a surplus from the 1,125 beaver? Under proper protection the number of beaver probably would reach 2,000. No doubt the quail congregate on the protected areas, yet every indication points to the conclusion that they live and raise their young on these limited areas. To obtain such production of quail as indicated, the State could well afford to plant suitable spots to grain along the river gorge as food for quail and for turkeys.

Since the East Gila as well as the other two prongs—the West and Middle forks and their main tributaries—is in the proposed Mogollon Wilderness, the State Game Department, in cooperation with the U. S. Forest Service, could carry out some experiments in watercourse protection which would furnish most interesting and convincing examples of game and fish production. In most of this area, the main watercourses could be protected by short cross-cut fences; the miles of side-walls would serve as side fences. The experiment would warrant the Game Department in furnishing a deputy to care for the watercourses selected. Under present conditions these watercourses serve as little more than watering places for cattle. By the use of watering lanes, every few miles, the experiment could be carried on to the advantage of the cattle on the area. With no opportunity to ramble up and down the gorges, the cattle would not defer the climb back to better ranges. A large per cent of cattle that die of poverty, perish along these deep, carved watercourses. The animals must descend into them for water, but when once there, the temptation is so great to remain, with difficult trails up towering slopes confronting them, that they divest the main watercourses of vegetation, to their own detriment. It would, therefore, be only good business on the part of cattle growers to do the one great thing the conservationists of water, timber, game and fish desire.

What is true of the Gila River is true of every mountain and plains stream in the State. Streams need only a little protection to enable them to multiply their productiveness and value, yet everywhere in the State they are rapidly being divested of their main attraction—the trees. Young trees have no chance to grow under the abusive utilization that prevails.

The creation and perpetuation of the little winding stream jungles everywhere are a national as well as a State need. The space they occupy, whether on the farm, deep in the creek bottom, canyon course or on overflow lands, has no appreciable value from the standpoint of agriculture or stock raising, but as little jungles they have an intrinsic value. As boys how many of us got our greatest thrills and enjoyment from these little jungles—the jungles we resorted to at every opportunity to follow our dog after rabbits, squirrels or coons, or to hunt quail, fish, or to set our traps for furbearers? The intensity of the joy and satisfaction thus derived demands that this little institution, the wasteland jungle, be perpetuated for the American boy and man. These little spaces, properly protected, are the only means of conserving the small game in reclaimed canyons and valleys as commercialism aggressively overrides every weakling of Nature that does not have the sympathetic support of organized forces to oppose it.

PREDATORY ANIMALS:

Predatory animals are the second most serious enemy of game conservation in New Mexico. The scarcity of ground cover increases immensely depredations by predatory animals on game, not only by exposing the game, and especially the young to depredators, but the lack of sufficient food often so weakens adult game, as deer, antelope and turkeys, that it has little resistance to enable it to escape even from such enemies as coyotes and wildcats.

Depredations by predatory animals on game reach their greatest proportions as the game becomes scarce, especially when it is solitary or in bands of a few individuals. A coyote, for example, may pay little attention to a bunch of deer or antelope; in turn a large band of game possesses courage. But let a lone deer or antelope appear and the coyote accepts this as an invitation to feast while the lone, timorous and excited animal invites rather than discourages an attack. And so it is, the individual game animal or a few together becomes the easy prey of predatory animals.

The systematic control of predatory animals is one of the most vital factors in any game conservation movement today. Formerly, when wild life had few other enemies, predatory animals exerted little influence on its abundance. In fact, predatory animals under primitive conditions were decidedly beneficial in preventing superabundance and in eliminating the weaklings and unfit. Furthermore, they were potent factors in the process of distribution. But today we have an entirely different ratio of hunters to the hunted. Then, too, game and game ranges have been greatly reduced, and predatory animals, naturally, harbor where the game finds most protection from man. Compared with their prey, in the limited cover

where the remaining game ranges, coyotes, because of more recent adaptations, are more numerous. Wildcats, which are serious enemies of game, are also numerous in most game covers.

As result of concentrated hunting by Federal and State organized forces, and activities of ranchmen, the predatory animal problem so far as the livestock industry is concerned, has largely been solved. The big wolves, the worst predatory enemy of cattle, have been brought under control while mountain lions no longer seriously affect the livestock industry. Today coyotes are the main depredators, and they will continue to be the problem in predatory animal control.

Many ranchmen take an active interest in controlling coyotes and other predatory animals on their ranches; some in the mountainous areas keep trained dogs for trailing cats and mountain lions. This interest should be encouraged, and trained dogs, judiciously used, should also be permitted to further control mountain lions and wildcats on the National Forests.

Today the sportsman is even more concerned in predatory animal control than the ranchman. In the mountainous areas, especially, the increase in the game supply is largely dependent on predatory animal control, particularly of coyotes and wildcats. During the last two years there has been evidence of a marked shortage of young deer, or such shortage has been more in evidence in recent years. My own observations and experiences lead me to the conclusion that no more than 20 to 30 per cent of the young deer now reach maturity in the State. The annual kill that the supply will stand bears out this estimate. This shortage of young deer is due largely to ravages of coyotes and wildcats.

Formerly, when game was more abundant and when cost of producing cattle was low, losses through depredations by predatory animals did not give such serious concern; but today with the decreased supply of game and the increased cost of producing better grades of cattle, predatory animal control has become a part of an economic program—it is essential in our intensive livestock industry and in our game propagation activities.

The effectiveness of predatory animal control as relates to game conservation is best illustrated in the Upper Gila River drainage. I have made a careful study of the relation of predatory animals to game on this area, which I have known for many years. This is the best deer and turkey range in the State; in fact it contains more deer than any other area or combined areas of the same size in the State.

Formerly, mountain lions took a tremendous toll of deer from the Gila drainage, not less than 2,500 to 3,000 annually. Through activities of Biological Survey hunters and ranchmen, this drain has practically been eliminated, although increased hunting by man and depredations by coyotes have almost absorbed savings effected through mountain lion control. The influx of coyotes to the drainage has been fought but so stubbornly have they persisted that considerable numbers remain.

In spite of depredations by predatory animals and intensive hunting by man

THE MOUNTAIN LION AND ITS WORK

Upper: *Mountain lion trailed down and treed by dogs belonging to a Government hunter. (Photo. by Albert Pickens)*

Upper Right: *Spotted mountain lion cub exercising its claws, the mountain lion's main weapon of attack*

Lower: *Remains of mule deer buck, killed and eaten by a mountain lion*

the deer supply has increased in the Gila drainage. The area now contains more than one-third of all the deer contained in the National Forests of the State. The deer in the Gila drainage should sustain a 10 to 12 per cent annual kill and permit of continued increase to the saturation point of the range. Less than a thousand deer are being killed annually in this region by hunters. Eagles are rather numerous over most of the region and no doubt exert some influence on the game supply. The kill of adult deer by coyotes is also a very serious drain and is becoming more so from year to year.

Data from ranchmen, Biological Survey and Forest Service officials give assurance that a high percentage of deer are born; but the percentage that reaches maturity remains low. Turkeys fare even worse in this region due not only to predatory animals and eagles but because of impaired living, breeding and food conditions, the result of overgrazing.

Although there are approximately 600 antelope on the open mesas, valleys and pine parks of the Gila drainage, where they have obtained very good protection against law violators for several years, their increase has been slow. In the case of some bands, evidently exposed more to inroads by coyotes, wildcats and eagles, the numbers remain about stationary.

The complete control of predatory animals in the Gila drainage would prove to be of much scientific and economic value.

(a) Timber or Gray Wolves: So far as concerns protection of wild game, the big wolves of the State are no longer a menace since they are practically eliminated from New Mexico. We are concerned merely to the extent of preventing reinfestation from Mexico. But so long as capable, salaried men are available for keeping down any influx from adjacent states or Mexico, the wolf situation is under control.

(b) Mountain Lions: Mountain lions also have given way under the pressure of intensive hunting. Although they are still widely distributed throughout the State, they are nowhere common and commit far less damage to game than was formerly the case.

Successful mountain lion hunting is the business of well equipped, salaried men who can afford to remain in pursuit of these wanderers of the wild places. In recent years, however, there has developed a national interest in mountain lion hunting. Such hunting for sport has had some effect on their control, in addition to bringing revenue to guides and thrills and adventure to the hunter. But depredations by mountain lions are so serious to both domesticated animals and game, particularly deer, that their complete control, which is only a matter of continued systematic hunting, is now essential.

(c) Coyotes: In predatory animal control coyotes are the most serious problem confronting us today, not only in New Mexico but throughout North America. Like our Jim Crow, the coyote appropriates civilization to his own good and profits rather than loses by its domination.

In former times coyotes were thought of as prairie or plains dwellers. And as such dwellers, because of their economic value as destroyers of prairie dogs, rabbits, rats and other rodents, were not considered a serious menace, except locally on sheep ranges. But as man began to utilize the mountainous areas for grazing purposes and hunting, these aggressive, inquisitive carnivores began to push forward into every nook and corner and have become resident.

Today coyotes are established in all mountainous and timbered areas, not only in New Mexico, but throughout the entire southwest, even ranging to and above timberline, on the highest peaks. Although they are not abundant anywhere in such types of country, their numbers are sufficient to enable them, in many sections, to keep the depleted game from increasing. The lack of other available food as rabbits, in the mountainous country, further aggravates the relation of coyotes to mountain dwelling game. In the absence of their natural prairie dwelling food, they turn to game, and a few individuals can commit serious depredations. Furthermore, these mountain dwelling coyotes are larger, more powerful and more active animals—a marked influence of environment—than their kindred of the lower altitudes. And, as a rule, they are more difficult to eliminate; their capture usually entails much skill and painstaking effort.

In their foster range of mountains and forests, coyotes appear now to be taking special delight in hunting down adult deer, not only in New Mexico but also in other sections where coyotes are becoming established in mountainous, deer ranges. They appear to revel in the sport of running deer over the snow in forests and mountains and, in the Great Lakes States, over icelocked lands in winter, where, by combining forces, they experience little difficulty in pulling down grown deer under severe winter conditions. I, personally, know of several instances in New Mexico where two to four coyotes killed grown deer. These grown deer killing activities are not now confined to winter only but apply to any season.

Coyotes are liberally endowed with speed, endurance and time, the three requisites for conquering their prey. The continued heavy depredations on big game, deer and turkeys, by predatory animals in New Mexico are almost entirely the result of coyotes becoming established in the forests and mountainous areas. The sportsman, rather than the ranchman, in this case, is the heaviest loser.

In New Mexico deer and turkeys and young of antelope are the principal big game prey of coyotes. Turkeys, both domestic and wild, are a source of much interest to the coyote and he appears to get much amusement out of getting into a feeding flock. In the case of the wild birds, however, his killing, for the most part, is confined to young or inexperienced birds. But loss of young from this source is a serious drain on the supply.

In the summer of 1925 a Forest Service fire warden or lookout man had an opportunity, from his tower in the Sacramento Mountains, to observe the actions of coyotes after a flock of young wild turkeys. He advises that although there was a nice flock of these young birds when first hatched, a pair of the coyotes soon

WILDCATS AND COYOTES ARE THE ETERNAL ENEMIES OF WILD LIFE

Upper: Coyote and wildcat trapped by Government hunter
Lower: Trapped coyote on antelope range

became so expert in catching them that one by one they disappeared until the mother bird was left without a single young.

In view of the abundance and vast distribution of coyotes, coupled with their cleverness in evading man's efforts to control them, there should be no interference with successful means of destroying them nor with the sale of their fur. It would be well for North America if coyote fur were made the fashionable fur for all time to come. They might then be better controlled.

(d) Wildcats: Although in size, the wildcat is not a large animal, he is muscular, athletically powerful and is one of the most serious foes of fawns and turkeys and other game birds. Wildcats are tireless, skillful hunters and while they have an economic value as destroyers of injurious rodents, their fondness for game makes them one of the greatest enemies with which the sportsman has to contend. The mountain forms range in weight from 15 to 25 pounds. These depredators are widely distributed, adapting themselves to all altitudes and types of country in the State.

During several years while conducting organized predatory animal hunts for the Biological Survey in the Black Range and Mogollon Mountains, in the summer seasons, the killing of wildcats that had feasted on fawns was of common occurrence. Often the dogs would pick up cat trails at the scene of the kill, trail and tree the killer, which would be gorged with the meat of the fawn.

Wildcats, as a rule, are nowhere abundant, but when their skill as hunters and killers is taken into consideration, it is not difficult to understand how they seriously affect the increase of game. One cat, which knows its range, as a farmer does his farm, and the retreats of a mother deer and turkey, has little difficulty in locating and catching the inexperienced young.

Wildcats are destructive to all kinds of game birds, including quail and grouse, but under the pressure of continuous hunting they have been killed or driven out of settled or more exposed areas and have consequently retired to the forested mountainous areas where they find better shelter against man.

(e) Golden Eagles: When black or golden eagles become numerous, as is the case in many sections of southern New Mexico, they are a serious enemy of certain species of game. Formerly when trappers used meat baits for taking fur-bearing and predatory animals, eagles were commonly trapped; but since meat baits have been replaced by the improved invisible scent bait, few eagles are trapped. They are, however, easily poisoned and some are thus killed.

Eagles are not without economic value; they prey freely on jack rabbits and prairie dogs; but once they become numerous, like many other species of more or less neutral benefit, the undesirable side of their nature manifests itself. The most serious crimes of which these majestic birds are guilty are the killing of calves, young antelope, fawns, young mountain sheep, turkeys and young of domesticated sheep and goats. No doubt their most serious depredation is on mountain sheep since they are always most numerous about the rugged desert

WHOLLY BENEFICIAL BIRDS OF PREY

Upper: A pair of spotted owls at home in the Black Range
Lower: Swainson hawk leaving its resting perch

COMMON SCENES ALONG OUR HIGHWAYS

Most of our hawks and owls are more beneficial than harmful, yet this is the justice we mete out to these friends of man

ranges, such as the Guadalupe, San Andres and Big Hatchet, where the sheep dwell. Unfortunately, golden eagles nest and raise their young on the cliffs, where the sheep have their young and at approximately the same time.

The oft repeated expression of having an eye like an eagle as applied to a close observer may be relatively but is not literally true. Probably nothing has keener eyesight than the eagle, although the wild turkey is a rival as regards short range eyesight. The skill with which this navigator of the air discovers and captures its prey is uncanny, however, where there is rank vegetation, even these keen eyed warriors have difficulty in locating their hidden prey.

(f) Hawks and Owls—Harmful and Beneficial: In the indiscriminate killing of her big hawks, New Mexico is being deprived of a very important economic asset. That such friends of man are rapidly becoming exterminated is attested by the decaying forms of the big red-tailed, rough-legged and Swainson hawks that continuously appear along the highways. In fact, throughout the entire southwest this slaughter is and has for many years been taking place. The telephone and fence lines that parallel the highways everywhere in open country offer attractive and often the only resting perches for these birds between their excursions afield for rabbits, prairie dogs and other injurious rodents. The frequency of motor cars causes them to abandon somewhat their vigilance with the result that the occupants of these vehicles succeed in murdering them with their rifles and shotguns before they have an opportunity to sense danger.

All of the hawks above mentioned are man's friends and try to be friendly with him; yet everywhere their numbers are being reduced by this thoughtless vandalism. We are already paying for this folly and will continue to do so in an increased abundance of destructive rodents, the principal food of hawks and owls. Injurious rodents, as rabbits and rats, were never more numerous and destructive in the southwest than they are today, and when they do reach the stage where they are unrestrained by natural enemies, we may then appreciate the economic value of the big hawks. The slaughter of the big hawks is one of the causes of this marked increase in these greatest destroyers of food and forage in the land.

Ninety per cent, or more, of all hawks which are killed in open country are large birds and are more beneficial than harmful. Their range constitutes the open prairie and valley lands where they can do little damage, even should they be so inclined. No one well informed denies that the elusive Goshawk, Cooper and sharp-shinned species are destructive to game birds. For the most part they are dwellers of mountains, forests and timbered watercourses, hence few of them are seen by the average person, and so alert are they that not often are they killed. The hawk or owl that renders itself an easy target is generally one that should not be killed. If the policy of killing hawks in the act of destroying game or poultry, only were followed, the valuable birds would be little disturbed.

Prohibition of all hawk and owl killing in New Mexico would be far better than to permit the indiscriminate killing of the birds of prey. By enforcing such a law New Mexico would have little to lose and practically everything to gain

because, as already stated, the valuable and not the injurious forms are being killed. Where there is sufficient ground cover, the number of game birds that are killed, excepting the dusky grouse, by even the most destructive hawks is small. For the most part, the food of these highwaymen consists of the aggregate rank and file of the multitude of birds that are not hunted as game, many of which need the hawks as a controlling factor. The presence of hawks tends to keep birds alert and does not permit them to become congested in certain areas.

The killing of hawks has a direct adverse effect on game birds and animals that is not generally taken into consideration. When range forage is scant, as is often the case in New Mexico, the hoards of rodents often eat and store the greater part of the seeds, an important food of game birds. Game cannot compete with these industrious harvesters and consumers. While man's efforts are effective in killing rodent pests, their numbers are so vast and the infestation so universal that the influence of hawks and owls is or has been one of the best and cheapest controlling factors.

In our dealings with the so-called enemies of wild life, we should consider carefully effects that may become cumulative. Scientific study and observation have demonstrated that our big, slow-flying hawks fall in such a category. The farmers and ranchmen of the plains and open sections of the State are now becoming deeply concerned over the abundance of destructive rodents and are seeking the cause and remedy. The cause is due to the killing off of their natural enemies, including hawks, owls, coyotes, badgers and skunks. We disrupt the great natural balances in the existence of the tenants of the wild open spaces and as a result we find ourselves confronted with puzzles that do not readily submit to our solution. We must control those species that turn their activities of destruction to our game and domestic animals; but the big, prairie dwelling hawks do not fall in this class and probably never will.

In the killing of our most valuable hawks we have committed an almost unamendable crime. The finest and most handsome hawk of the American plains and mesas, the ferruginous roughleg, is already approaching extermination. The handsome Swainson hawks, formerly abundant on the prairies of the southwest are also greatly reduced in numbers. Formerly I have seen these hawks gather in flocks of hundreds during the fall migration, in the valleys and on the open plains of New Mexico, when they were feeding almost exclusively on the big wingless grasshoppers. Such interesting and valuable congregations are now quite uncommon.

Highway Associations of the land should be appealed to to call on the traveling public to leave their rifles and shotguns at home where they belong and to give our valuable birds of prey the protection they should and must have.

(g) Magpies Enemies of Game Birds: That the magpie is a confirmed enemy of quail and pheasants and other birds is borne out by observation and investigation. Fortunately, at breeding time these birds occupy only a narrow

UTAH
COLORADO
OKLAHOMA
TEXAS
ARIZONA
MEXICO
SAN JUAN
RIO ARRIBA
TAOS
COLFAX
UNION
MORA
HARDING
MC KINLEY
SANDOVAL
SANTA FE
SAN MIGUEL
BERNALILLO
VALENCIA
GUADALUPE
QUAY
CURRY
ROOSEVELT
DE BACA
CATRON
SOCORRO
LINCOLN
CHAVES
SIERRA
GRANT
OTERO
LEA
EDDY
HIDALGO
LUNA
TORRANCE
AZTEC
TIERRA AMARILLA
RATON
CLAYTON
TAOS
MORA
MOSQUERO
LAS VEGAS
GALLUP
BERNALILLO
ALBUQUERQUE
SANTA FE
TUCUMCARI
SANTA ROSA
LOS LUNAS
ESTANCIA
FT. SUMNER
CLOVIS
PORTALES
SOCORRO
RESERVE
CARRIZOZO
ROSWELL
HILLSBORO
SILVER CITY
ALAMOGORDO
LOVINGTON
LORDSBURG
DEMING
LAS CRUCES
CARLSBAD
EL PASO
JUAREZ
Lake Burford
Lake Maloya
Lake Fraser
Lake McMillen
Lake Avalon
Rio Grande
Pecos River
Canadian River
Cimarron River
Gila River
San Francisco River
San Jose River
Ciengga del Macho
Hondo River
Felix River
Penasco River
Seven Rivers
Sacramento River
MAGPIE
Breeding Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES

zone in northern New Mexico; however, in winter there is a short southward movement and the infestation is increased; but at this season the birds appear to do little damage.

Like that of the eagle and raven, the ability of magpies in locating their prey is uncanny. No doubt their presence in northern New Mexico has contributed considerably to the difficulty of getting Gambel quail and pheasants established in certain localities. In some cases, as on the Scheley Ranch, in Mora County, gauze covers had to be placed over the nests of domesticated turkeys, to prevent magpies from destroying the eggs. This affords a good reason to believe that they also destroy the eggs of wild turkeys when opportunity permits.

In Colfax County a farmer flushed a pheasant from a nest full of eggs. He later returned to show the nest to a companion and, to his amazement, found several magpies about the nest and all the eggs destroyed.

Magpies are easily destroyed by the use of poison and their control in the State should be included in the program of the Federal-State predatory animal control operations.

(h) House Cats: House cats are among the worst enemies with which the smaller game and song and insectivorous birds are confronted in and adjacent to villages and rural settlements. Unfortunately, these pests become more serious with increased population, and, furthermore, they are even harder to overcome than wild forms, as they cleverly cover their tracks and, as a rule, make their daily abode at man's habitation. The elimination of the prowling cat is rendered all the more serious due to the fact that owners of such cats often will not admit that their household pets are bird destroyers.

Vagrant cats, like worthless prowling dogs, often become so numerous that they are not only predatory as domestic species, but become wild or semi-wild and rely on rodents and game entirely for food. But, fortunately, when they do become wild, they are more easily eliminated because they then fall in the class with wild predatory species.

In every community there is always a surplus of prowling cats which are a public liability. If sportsmen of New Mexico expect to get quail and other birds fully and permanently established in the populated irrigated valleys and in other farming districts, they must conduct a relentless war against the vagrant cat. Boys, and especially the Boy Scouts should be induced to hunt vermin—if fur producers, in season—and especially wild, prowling cats at any time.

LAW VIOLATIONS:

The first and most important step in game law enforcement is to have sane, equitable laws which public sentiment will defend. Laws that are questionable as to their practical value should not be on the statute books while those that have the approval of the public should be enforced. This report contains suggestions and recommendations applicable to the making of equitable game laws.

The need for an adequate force of officers to enforce game and fish laws in the State is so obvious that the subject needs little comment.

To maintain an adequate field deputy service money is necessary. Due to sparsity of settlement, the big states of the arid west and southwest have only limited funds for conducting their Game Departments. Sportsmen of these states, however, are fortunate in having the efficient and liberal cooperation of the United States Forest Service whose officers all serve as deputy game wardens. Sportsmen in New Mexico, are especially indebted to the Forest Service for the excellent cooperation it renders in the interest of general game protection, and to the Biological Survey for cooperation in the protection of migratory wild fowl and insectivorous birds, and the closest cooperation should be extended to these services by the Game Department and the Game Protective Associations.

One of the most effective means of getting the average farmer, ranchman or other rural inhabitant to respect game laws is first to stop the city man and the person of means from violating or buying his freedom when he does violate. Neither money nor influence should save those who deliberately violate game laws from paying the penalty.

A very serious practice of game law violation is in connection with big commercial developments, as oil, lumbering and mining activities. Often men of means or ability to cover their tracks, and with no local ties, kill antelope and other game whenever opportunity permits. In certain sections of New Mexico entire bands of antelope have recently been thus wiped out. Men of this type, unconcerned in the welfare of the State, should be made to respect the laws to the limit of their provisions. The rigid restrictions thrown about nonresident hunters are necessary because of abuse of opportunities by a few who try to evade the laws.

In New Mexico, Game Protective Associations, with their urban and rural membership, have been and are doing splendid work in abating game law violations. The prevalent sentiment on the part of the majority of citizens of the State in favor of practical game conservation has also had its favorable effect.

In the protection of refuges, it is encouraging to note that there is a personal interest manifested, often to the point of jealous concern, by local citizens and ranchmen who live near such refuges. This interest in seeing that the refuges are properly respected has a decided favorable effect on law enforcement on refuges. Such attitude on the part of interested citizens should always be commended and encouraged at every opportunity by the Game Department and sportsmen's associations.

The principal demand for salaried deputies occurs a little in advance, during and after the hunting season. Unpaid deputies, especially in the rural districts, as a rule, are not satisfactory. Furthermore, in the enforcement of game laws, one must be paid for making enemies. The violator does not resent nearly so much being apprehended by a salaried game warden who he knows is carrying out the duties for which he is being paid than he does being arrested by one, perhaps of his community, who is doing so in the interest of conservation alone. Especially if one is in business, he cannot very well afford to incur the enmity of

violators and for this reason many arrests and prosecutions are avoided. Where a man is not dependent on local support and patronage in business, he can enforce the law without fear or favor.

The Game Department and cooperating agencies are duty bound to enforce game laws which the people, through their legislators, enacted. These laws made by the people and for the people should be obeyed. The way to avoid penalties of the law, embarrassment of being apprehended or the bitterness of having an annual hunt or fishing trip spoiled is to learn the provisions of the laws and respect them. Too many hunters and fishermen want laws that apply to the other fellow but not to themselves when they have an opportunity or the inclination to evade them. The best cooperation the hunter can give to the Game Department—and the cheapest to himself and the public—is in the respecting of game laws.

SUPERANNUATED COTTONWOOD

Type of tree that is rapidly disappearing in New Mexico and too often no young of its kind are coming to replace it.

BIG GAME COUNTRY AND SOURCE OF COLD WATER FISHING STREAMS
WHITE MOUNTAINS, NEAR ALAMOGORDO

SPECIES OF GAME NATIVE TO NEW MEXICO

Every locality in New Mexico is naturally suited to some form of game. Big game is now absent from only one section of the State—that portion lying north of the line of the Santa Fe Railway and west of the Puerco River, known as the Navajo country. By long and intensive hunting, the Indians have exterminated big game in this region.

The abundance of high, rugged, timbered mountains, canyons and mesas throughout the length and breadth of New Mexico, except in the extreme southeastern section, has naturally favored game from extermination at the hands of man. Forests, including commercial timber, and wooded lands, comprise about one-fifth of the State's area of 122,503 square miles. The mountainous ranges and surrounding areas constitute range for a variety of game, while the troughs and valleys lying between provide ample areas for prairie and valley dwelling species. Range suited for game in the State should not for many generations, if ever, be seriously curtailed if used wisely.

On the extensive plains and throughout the valley lands of the State open plains dwelling species, as antelope, prairie chickens and quail, are to be found, every section being favored by one or more kinds. Quail of some species occur naturally in every county of the State. Antelope remain in 22 of the 31 counties. Deer may still be found in all but three counties—De Baca, Curry and Roosevelt—and wild turkeys in 17 counties. Bear occur in 18 counties.

While deer, turkeys and quail are now the principal resident game of the State and the object of most hunting trips, the great variety of other resident forms, under proper protection and management, can be made to contribute their share to the hunter's kill, thus greatly reducing the tax on the most hunted forms.

Buffalo, elk and sage grouse alone were exterminated in the wild state in New Mexico. To permit any other species, no matter how insignificant, to go by this route, would be a crime that could never be obliterated from our annals.

The buffalo can never again occur in the State as wild game since its presence is incompatible with the white man's occupation of the land. At the present writing there are no more than a dozen buffalo in New Mexico. This species is not considered under a separate heading.

RESIDENT NATIVE GAME ANIMALS AND BIRDS OF NEW MEXICO

MAMMALS

1—American Bison (Bison bison) Extinct in wild state.

2—Deer—Four species:
- (a) Elk (Cervus canadensis) Exterminated but reintroduced.
- (b) Mule (Odocoileus hemionus).
- (c) White-tailed (Odocoileus macrourus).
- (d) Arizona White-tailed (Odocoileus couesi).

3—Mountain Sheep—Two forms:
- (a) Mexican Bighorn (Ovis mexicanus).
- (b) Rocky Mountain Bighorn (Ovis canadensis) Extinct.

4—Prong-Horn Antelope (Antilocapra americana).

5—Squirrels—Four Species:
- (a) Abert or Tassel Eared (Sciurus aberti)
- (b) Red (Sciurus fremonti neomexicanus).
- (c) Arizona Gray (Sciurus arizonensis).
- (d) Rock or Ground squirrels (Several kinds).

6—Rabbits—Three General Kinds:
- (a) Jack Rabbits (Several forms).
- (b) Snowshoe (Lepus bairdi).
- (c) Cottontails (Many forms).

7—Bears—Two species:
- (a) Grizzly.
- (b) Black.

8—Collared Peccary (Pecari angulatus).

BIRDS

1—Merriam Wild Turkey (Meleagris gallopavo merriami).

2—Grouse—Five species:
- (a) Sage (Centrocercus urophasianus) Exterminated.
- (b) Dusky (Dendragapus obscurus).
- (c) Lesser Prairie Hen (Tympanuchus pallidicinctus).
- (d) Columbian Sharp-tailed (Pedioecetes phasianellus columbianus).
- (e) White-tailed Ptarmigan (Lagopus leucurus).

3—Quail—Four species:
- (a) Scaled (Callipepla squamata).
- (b) Gambel (Lophortyx gambelii).
- (c) Mearns (Cyrtonyx montezumae mearnsi).
- (d) Texan Bob-white (Colinus virginianus texanus).

BIG GAME CENSUS

To estimate intelligently the number of big game animals or birds over occupied areas as large and as diversified topographically, as is New Mexico, is the most difficult part of a state-wide game survey. This phase of a survey is also open most to question and divergence of opinions. Estimates, however, are necessary, at times, as a working basis for planning the restoration and protection of game.

The more widely distributed the species and the greater the variation of numbers over given areas, obviously, the more complex becomes the problem of making estimates. Mule deer, for example, range over approximately 24,000 square miles or about one-fifth of the State's area. When the animals are evenly distributed over restricted areas, definite conclusions can be arrived at through actual count, by tracks and by comparison with the known number of cattle occupying the same range. Mule deer still occupy practically all suitable range formerly inhabited by them in the State; but where most exposed to their many enemies, they have become so scarce that the closest observation is necessary in order to determine definitely much of the inhabited range, because much of the time the animals may be temporarily entirely absent from a given portion of the range.

In making my estimate of the number of deer in the State, I have averaged the entire deer territory, both on and off the National Forests. In some sections, as on portions of the Gila, Datil and Lincoln Forests, for example, the present deer population is comparatively heavy, in places being 25 or more to the square mile. Over much of the northern area and territory adjacent to Indian Reservations, there may be no more than one deer to every four or five square miles.

White-tailed deer, both the large form and the small Arizona species, probably do not constitute more than one-sixth of the deer population of the State, mule deer making up the balance. The range of the white-tails, approximately 8,000 square miles, lies practically within the limits of the habitat of the mule deer .

The matter of estimating the number of elk, mountain sheep and antelope in the State is simplified due to the fact that there are limited numbers of these, segregated in known bands. In the case of antelope, the census is largely based on actual count, however, there are probably a few more antelope than shown, since, in some cases bands were recorded before the young were born in 1926.

Taking a census of wild turkeys is even a more intricate matter than that of estimating the number of deer. These birds, like quail or grouse, are so affected and influenced by annual and even seasonal fluctuations that definite average numbers on which estimates can be based do not often exist. Turkeys at the present time range over a surprisingly extensive territory in the State, taking into consideration the persecution to which they have been subjected and their range requirements. They now inhabit approximately 9,000 square miles of territory in the State. My turkey estimates are as of the end of 1926. Had the estimates been made four or five months earlier, they would have been greater, as mortality among the birds during the last four months of the year is heavy.

BIG GAME CENSUS 1926

Species		Estimated Numbers
Elk (Reintroduced)		712
Deer (All Species) On National Forests	36,000	
Deer (All Species) Off National Forests	5,000	41,000
Antelope		2,957
Mountain Sheep		325
Bears, Brown and Black	750	
Bears, Grizzly	20	770
Turkeys, On National Forests	15,000	
Turkeys, Off National Forests	6,000	21,000

NUMBER OF BIG GAME THE STATE SHOULD SUPPORT

Species	Estimated Numbers
Elk	10,000
Deer	200,000
Antelope	100,000
Mountain Sheep	10,000
Bears	5,000
Turkeys	125,000

Considering the vast size of New Mexico and the great amount of land that cannot be utilized except for grazing and forests, the foregoing estimates of the numbers of game animals the State should support are conservative. Whether or not increases to the extent of the numbers given are realized depends on how sincerely the people wish to have them. Such increases are not only possible but practicable.

PRESENT ANNUAL DEER-KILL:

Under more favorable conditions the present number of deer in New Mexico should sustain their numbers and even register a progressive increase under a 10 to 12 per cent annual kill. Under the existing conditions, the annual kill by all hunters, legal and illegal, including animals that die from wounds as result of being shot, does not exceed 2,500, or probably about 6 per cent of the total deer population.

The unsatisfactory status of the annual deer kill may be attributed to several causes,—impaired food conditions, inadequate ground cover, scarcity of animals over vast areas, which prevents proper mixing and breeding, shortage of bucks where the deer are scarce and depredations by predatory animals, particularly coyotes, wildcats and mountain lions. The deer, however, have already begun to increase practically all over the State.

LIFE SKETCHES OF GAME ANIMALS

BIG GAME

Much of interest might be said regarding the larger game animals of New Mexico but in a report of this nature, lack of space precludes giving anything but brief accounts. The object is to give the sportsmen and public such information as will: (1st), acquaint them with the various species native to the State; (2nd), show the distribution of the species and to indicate additional range on which it would be practicable to establish such species; and (3rd), to recommend means for increasing and conserving the species.

Obviously, in mapping the distribution of all species of game, small uninhabited areas are included since it is impracticable, on small scale maps, to exclude such minor unoccupied areas. Areas of considerable size on which the mapped species do not occur, however, are excluded. The main object has been to include all occupied range.

Recommendations for the expansion of the present range of game have been largely governed by the fact that the additional range thus indicated was formerly occupied by the various species.

Subsequent observations and studies may necessitate some changes and revisions being made in the historical and distributional records as herein given, but in the main, they are dependable.

Species and distribution of deer have never been clear in the minds of the sportsmen and others in the State. Names have been and still are loosely applied to deer, while vagueness and mystery are attached to species indigenous to different sections. The mule deer, for example, which is the most common and widely distributed species found in the State, is everywhere erroneously referred to as the "black-tailed" deer whereas it is a distinct species from the real black-tail deer which is an inhabitant of the humid forests of the northwest, from Central California to Southeastern Alaska. Although most people, and especially sportsmen, know of this distinction, the term "black-tail" has so long been applied to our mule deer that the misnomer persists. While the bush on the end of the mule deer's tail is black, the balance of the tail and the rump are white, whereas the true black-tail lacks this white marking. The mule deer derives its name from its very large ears.

A supposed species of black-tailed deer, the Crook black-tail, has been accepted by some as a true black-tail of southwestern New Mexico and Arizona. Several specimens of this deer have been procured, the type of the form having been taken in extreme southwestern New Mexico. But scarcity of this form and its characteristics indicate that it is a hybrid rather than a distinct species, and it is not considered worthy of recognition.

There is also a widespread and persistent belief in southwestern New Mexico that a "dwarf" or "rock" deer inhabits that region. So general is this belief that mystery has attached itself to the matter and some sportsmen give credence to the claims. The fact that with all the field work that has been conducted and specimens taken, no specimen of such a deer ever found its way into the museums or into the hands of competent judges makes its existence more than doubtful. This is probably a case of mistaken identity, the little Arizona white-tailed deer no doubt being the subject of confusion. Supporting this belief, it is noted that the supposed presence of the mysterious deer is only where the small Arizona white-tailed deer is found.

Our present knowledge of the New Mexico fauna warrants the conclusion that there are but three distinct species of deer in the State, exclusive of elk. More field work and the collecting of specimens from all sections of the State may be necessary to settle these moot points to the satisfaction of all concerned.

In treating the common white-tailed deer found in the State, I have separated the species into two geographic divisions. This division was not made because of distinctive anatomical characteristics but because of widely separated and distinctive types of ranges occupied. The white-tail which formerly inhabited the extensive sandhill sections along the entire eastern portion of the State but now reduced to a remnant of a few individuals, I have termed the "sandhill whitetail". Their exposed range and the present plight of these animals, warrant special action being taken in their behalf if the eastern section of the State is not to be deprived entirely of deer.

The range of the little Arizona white-tailed deer and the larger form I have shown on one map. In the Black Range and in other mountainous sections the range of the two forms over-lap. To determine the exact extent of range occupied by each in the southwestern section of the State would necessitate more intensive field studies and the collection of numerous specimens.

ELK

(Cervus canadensis)

Elk, one of the largest and most magnificent of North American big game animals, formerly inhabited much of the elevated and mountainous regions of New Mexico. The native animals were exterminated in the wild state in about the year of 1900, having made their final stand in the Sacramento Mountains. Elk have been reintroduced in the State and are becoming reestablished in several localities.

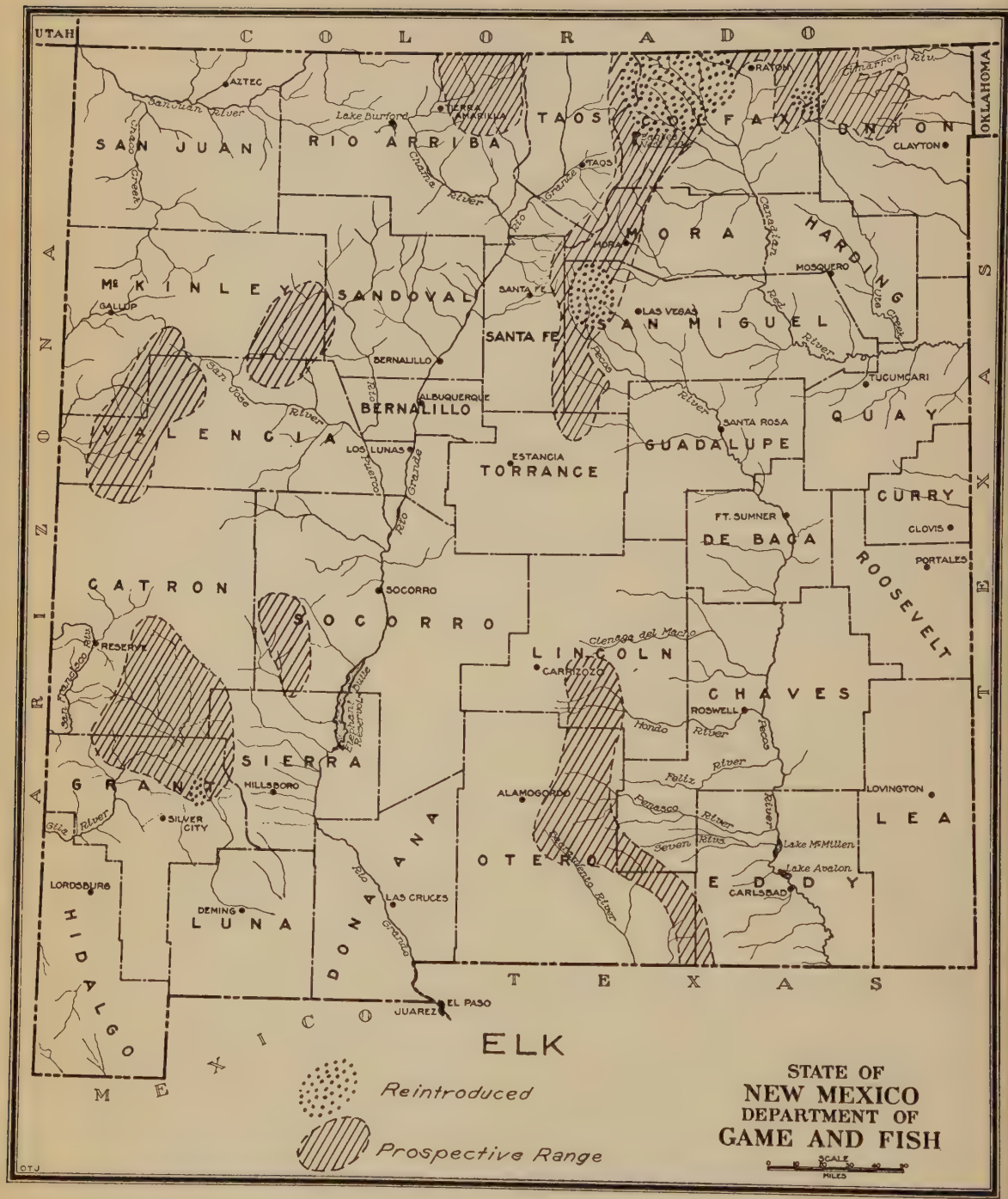
As game animals, elk are very desirable, and their former wide distribution in New Mexico is assurance that the State is adapted to their welfare. If reestablished in suitable areas, they will again become a big asset to the State. In selecting areas for their reestablishment, however, discretion should be used since the extent of their former distribution can hardly govern that of the future. There still are and probably always will be extensive areas in the State where the animals will be an abundant addition to the big game supply. But agricultural communities must be taken into consideration in any plans for reestablishing elk since serious objections may result on account of damage to growing crops or to stacked hay. In considering areas on the National Forests in which it is desired to reintroduce elk, the Game Department should have the concurrence of the U. S. Forest Service and Biological Survey.

PRESENT DISTRIBUTION:

At the present time there are four separate bands of elk in the State, the largest and best established herd, consisting of about 500 animals, being on the Bartlett and adjacent ranches, in Colfax County. The original animals from which this herd has grown consisted of 15 elk, which were brought to the Bartlett Ranch in 1911. The second best established herd is on the Santa Fe National Forest, on the Upper Pecos, where the animals were introduced in 1915. This herd now consists of about 80 animals; but they have been subjected to considerable illegal hunting. There is also a herd of about 75 on the Meloche Ranch, southeast of Raton, in Colfax County, where the animals were introduced several years ago. The most recent introduction was that of 25 elk on the G O S Ranch, on the Gila National Forest, northeast of Silver City, in 1926.

The rapid increase and spread of the Bartlett herd are good evidence of the ability of elk to reestablish themselves, where range is suitable and protection is given.

Elk, it would seem, might be reintroduced in the White, Sacramento and Mogollon Mountains and possibly in a few other sections. If this is done and a reserve supply of all herds is protected on refuges, limited elk hunting should again be enjoyed in a few years.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GRANT
OTERO
EDDY
LEA
LUNA
DONA ANA
HIDALGO
AZTEC
FARMINGTON
GALLUP
LAKE BURFORD
TIERRA AMARILLA
TAOS
RATON
CLAYTON
MOSQUERO
LAS VEGAS
SANTA FE
BERNALILLO
ALBUQUERQUE
TUCUMCARI
SANTA ROSA
LOS LUNAS
ESTANCIA
FT. SUMNER
CLOVIS
PORTALES
SOCORRO
RESERVE
CARRIZOZO
ROSWELL
HILLSBORO
SILVER CITY
ALAMOGORDO
LOVINGTON
LAKE McMILLEN
LAKE AVALON
CARLSBAD
LORDSBURG
DEMING
LAS CRUCES
EL PASO
JUAREZ
San Juan River
Animas River
Chama River
Rio Grande
Canadian River
Pecos River
San Jose River
Puerco River
Gila River
San Francisco River
Ciengga del Macho
Hondo River
Feliz River
Penasco River
Seven Rivers
Pecos River
ELK
Reintroduced
Prospective Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
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MULE DEER

(Odocoileus hemionus)

Taking New Mexico as a whole, mule deer are by far the most important big game at the present time. These deer, in addition to being the largest deer found in the State, are most widely distributed and are best adapted to its varied topography, altitude and climate. When pressed by hunters, they retire to remote and most inaccessible sections of their range and survive remarkably well under adverse conditions.

In the northern section of New Mexico, mule deer have undergone more intensive hunting for a much longer period of time than they have in the southern portion of the State. For many generations the canyons and valley lands which cleave the mountain ranges of the northern area have been inhabited, in many localities by Indians who are persistent and skilled deer hunters. Furthermore, unlike the southern portion of the State, the northern area contains higher mountains, in which the winters are often long and severe, thus forcing the deer into lower elevations where they have been exposed to the hunter. These unfavorable conditions have so long affected the deer that nowhere in the northern portion of the State are they numerous, except locally, where they have been protected on privately owned, enclosed lands.

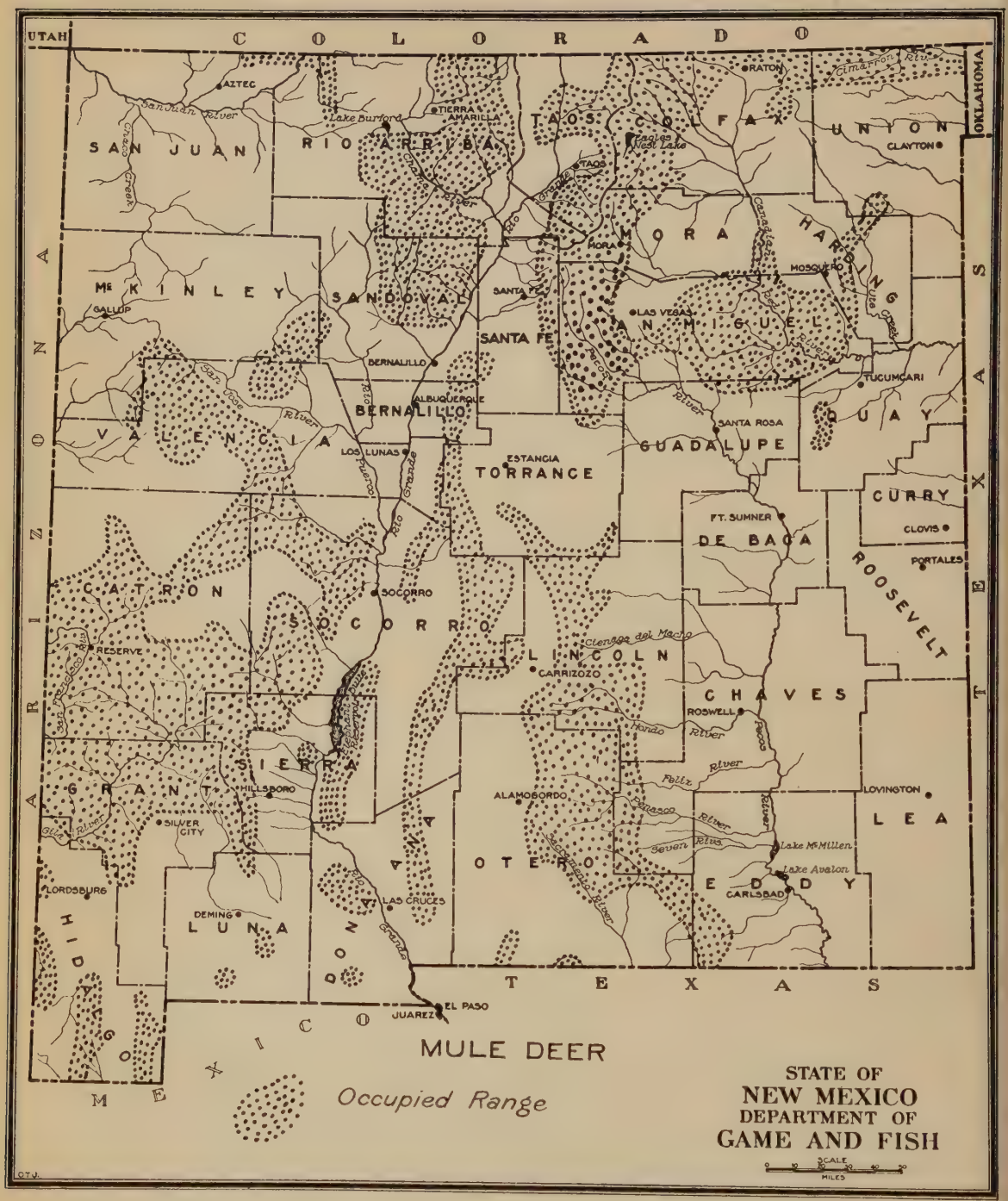
Northern New Mexico contains an abundance of summer range for mule deer, but suitable winter range, during severe winters, is limited. Even though law enforcement and refuges now favor them, excessive grazing in the foothills by domesticated animals seriously affects them in winter and interferes with their restoration.

In the winter of 1926-27, which was unusually mild, mule deer remained as high as timberline in the northern mountains until after Christmas but such winters are not of frequent occurrence. Dangers to game are always increased when it is forced, as by deep snow, from mountainous regions into lower areas.

Unfortunately, in the northern area, in the past, does and fawns have been most exposed to law violators and excessive hunting. The big bucks could better withstand the rigors of winter in the higher elevations and were therefore less exposed to hunters than the does and young deer which descended to lower levels.

The greatest number of deer, and consequently the best hunting, are found in sections remote from extensive settlements. The early settlers all over New Mexico, as elsewhere, had to rely largely on game for food, with the result that the game was often exterminated locally. Abuse of ranges about settlements, also, often caused deer to drift away from inhabited areas.

Illegal hunting of deer by Indians, in the northern and western sections of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STATE OF
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the State, is still a serious problem with which the State Game Department must cope.

In the southern area deer have a much better year-around range. Practically every winter, in this region, they can remain properly distributed throughout the mountainous areas, thus avoiding the serious conditions to which deer farther north are often subjected. Moreover, in the southern area a greater variety of suitable winter food is available, the live oaks being among the best emergency foods for them.

I have long questioned the wisdom of a "buck law" where mule deer are the dominant species hunted. As a rule, buck mule deer are easily killed and where the animals are excessively hunted, a serious buck shortage often results. Better enforcement of game laws and refuges, however, will no doubt meet the situation and make the law a practical one.

The mule deer is consistently larger than the white-tail. Adult bucks, when fat, sometimes weigh as much as 250 to 300 pounds, but ordinarily the animals weigh much less. They are a hardy and prolific species. These beautiful animals lend charm to any mountain setting.

DISTRIBUTION:

Reference to the distributional map will show that mule deer are still found in practically all broken and mountainous sections of the State, the only noticeable exception being the northwestern portion, the greater part of which has long been included in an Indian Reservation. Even along the most exposed eastern extremity of the wooded and broken type of range the animals have survived in sufficient numbers to restock, if given necessary protection. Since a few have survived the period of almost unrestrained slaughter and range abuse, it is reasonable to believe that with better protection they will increase along such exposed parts of their range.

Ranchmen here and there, who were determined in their efforts to protect remnants of deer, are almost wholly responsible for the presence of deer in many places. The fact that the animals are still well distributed appears to preclude the necessity of resorting to artificial transplantation. Mule deer, if given protection from law violators, will attend to the restocking process themselves.

ENEMIES:

The natural enemies of the mule deer are many, the most serious being mountain lions, wildcats and coyotes. Intensive mountain lion hunting by Federal and State predatory animal hunters and others has gone far toward eliminating this most persistent and wasteful destroyer of deer and has had a favorable effect in deer increase during the last few years.

Coyotes are from year to year becoming a greater menace to deer in the high mountainous sections. These tireless hunters are becoming better established in

the mountains each year and appear to be turning more to deer as a source of food. The coyote does not confine its depredations to the fawns and younger deer. Through cooperation, two or three or more, pull down many grown deer in the forested mountains, not only in winter when the snow is deep but at any time of the year. Coyotes possess both fleetness and endurance and hours or days are well spent by them if at the end of the chase a large dèer provides a feast.

Wildcats kill many small deer, but the coyote is by far the greater enemy of the adult animals. Control of the large, active mountain-dwelling coyotes is one of the important needs in better conservation of deer. The alarming feature in this connection is that although mountain lions, wolves and wildcats consistently give way under systematic hunting, coyotes have for some years been increasing in the western mountainous regions.

SPOTTED FAWN WONDERFULLY FAVORED BY NATURE IN COLORATION BUT EXPOSED TO ITS MANY ENEMIES BECAUSE OF SCANTY NATURAL GROUND COVER

WHITE-TAILED DEER

(Odocoileus macrourus)

The white-tailed deer has held its range and sustained its numbers in the contest with conquering civilization most successfully of any big game in the United States. Yet when not favored by natural protection, as brushy, broken, swampy or timbered bottom lands which did not profitably submit to the axe and plow, this hardy species, like other big game, was ultimately sacrificed.

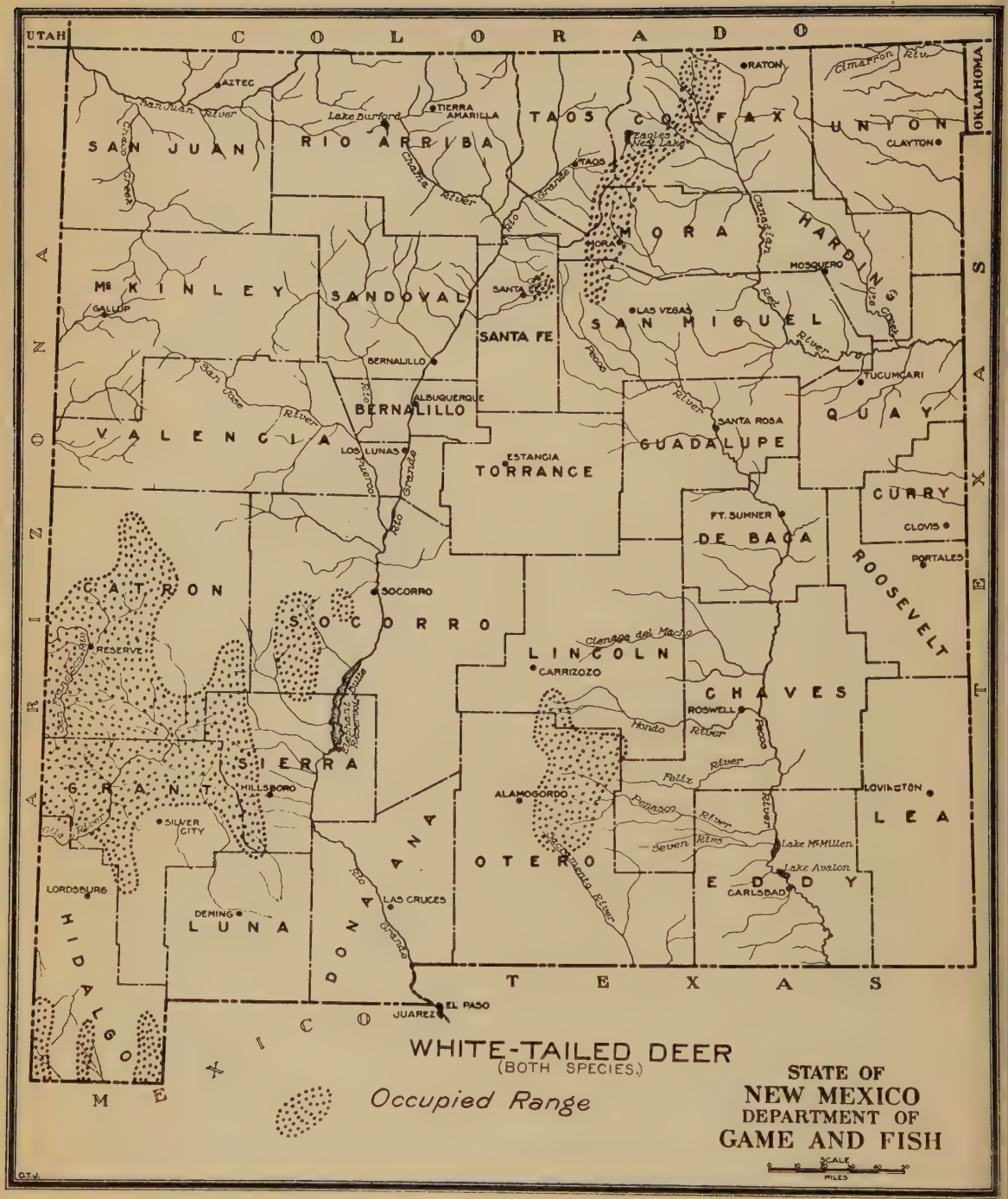
On areas suited to the white-tails in southern New Mexico, they have sustained their numbers as well as could be expected under the adverse conditions caused by excessive hunting, depredations by predatory animals and range forage abuse. But in the northern area, where apparently their distribution has always been limited and spotty, they almost disappeared during the last forty years. Today there are probably no more than 300 white-tailed deer in the northern half of the State. In some localities, however, they now seem to be holding their own and possibly increasing slightly.

Old settlers advise me that white-tails used to be the common deer in the Raton section where now there is only a trace of their former numbers. This is also true of the upper Pecos and the Taos section, where according to early day deer hunters white-tails were numerous where few, if any, now remain.

Doctor E. W. Nelson who spent some time on the head of the Pecos in the early days gives the following interesting account relative to white-tails in that locality at that time:

"From July to December, 1882, I lived in the vicinity of Cowles, on the upper Pecos River, continually hunting the canyons and mountain slopes between 7,000 and 9,000 feet altitude. At this time white-tailed deer were generally distributed on the brushy parts of slopes facing to the south and brush-grown benches, especially among aspen thickets. They were much less often seen on other slopes than the mule deer which they far outnumbered in that section of the mountains. At that time they were being hunted by everyone in the mountains, and many of them were killed in contrast to the very scanty number of mule deer taken. The white-tails were often killed at salt licks and about little park-like openings in the brush-grown forest. On many of the slopes, especially above 8,000 feet, both kinds of deer occurred. These high ranges were plainly the chosen summer haunts of the white-tails. These deer prefer the moist slopes, where an abundance of juicy deciduous brush and other vegetation grows, and do not take kindly to the drier lower slopes which often appear congenial to the mule deer except during heavy snows on the high country which forced them down from the upper Pecos. Any scarcity of white-tails in that region today is unquestionably due to over-killing and not to a migration."

Although I made close observations during the period of the survey, I could find no trace of these deer on the upper Pecos, and am informed by those who are familiar with the country that none have been observed there for many years.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Seven Rivers
Black Range
Gila River
WHITE-TAILED DEER
(BOTH SPECIES.)
Occupied Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES
O.T.V.

Mr. Elliott S. Barker, who was formerly Forest Supervisor of the Carson National Forest, and who is a close observer of wild life, has given me some interesting data relative to the white-tailed deer northwest of Las Vegas. Under date of January 30, 1926, he writes as follows:

"As to white-tailed deer on the Carson (National Forest) I have not been up there for about eight years; but previous to that time there were a few on the Taos Division. There was one little bunch on Lucero Creek and also one up in the vicinity of Red River. I do not know whether those bunches survived or not.

"We still have quite a few of these white-tailed deer near my ranch. I see them very often and their tracks, which are easily distinguished from the Blacktails (mule deer) tracks, can be found any time.

"There are two or three bunches, about twenty deer in all, that run in the Beaver Creek country, and on the divide between Beaver and Sapello. Also there is a bunch on the Hallinger Canyon, and another of which I have seen tracks only, that run west of Rociada. These are the only bunches that I know of for certain."

The deer that Mr. Barker refers to as being "near my ranch" are all on the eastern slope of the Sangre de Cristo Range.

In southern New Mexico, and especially in the Sacramento Mountains and Black Range, the white-tails have made a better showing for themselves. In these mountains they appear to have found more congenial conditions than they found farther north. In some sections of the Sacramento Mountains white-tails appear to be more numerous than mule deer and often occur in bands of 30 to 40 animals. I have also observed them commonly throughout the Black Range and San Mateo Mountains where they appear to thrive. In other mountainous sections of the southern half of the State, where conditions seem equally as good, they are entirely absent.

White-tails occur only in the mountainous sections that are characterized by extensive wooded lands. Nowhere are they observed in the drier desert ranges. Their range in the State is more or less definitely limited. Increase of the species is dependent on good protection, where it is well established and on enabling it to again occupy range which it formerly inhabited.

DISTRIBUTION:

The present distribution of the white-tailed deer is limited. On the distributional map I have endeavored to show the distribution as it occurred during the period of the survey, in 1926. In the southern area of the State the range is more general, consequently the best white-tailed deer hunting is to be had in this section.

The larger form of the white-tail does not appear to occur in the extreme southwestern part of the State. In this section it is replaced entirely by the little Arizona species.

ENEMIES:

Enemies of the white-tail deer are about the same as those of the mule deer. Mountain lions, however, have no doubt been a greater menace to white-tails than

to mule deer because the white-tails retire to cover of brush and dense timber more than mule deer, obviously giving the skulking lion a better opportunity to kill them. My observations have been, where the two species of deer are about equal in numbers, far more white-tails are killed. I believe this also applies in the case of wildcats, and without a doubt has had a direct bearing on the inability of white-tails to make a better stand in the higher mountainous areas—the main harbors of mountain lions and wildcats. No doubt the combined hunting skill of man and predatory animals accounts for the great reduction that has occurred in numbers of these deer in the northern area of the State.

ARIZONA WHITE-TAILED DEER

(Odocoileus couesi)

This beautiful, dainty deer is conceded to be the smallest of the white-tails. Its size is but little, if any, more than half that of its larger kindred, the Virginia or common white-tailed deer. The size of the horns vary a great deal, age of the individual determining the size of the antlers. These animals are often found in considerable herds and dash about among brush and boulders like so many rabbits.

These deer, in their New Mexico habitat, prefer an oak, pine or juniper range from 6,000 to 8,000 feet elevation; but, as a rule, they are convenient to crags or steep rugged canyons in which they seek shelter when molested. Where not seriously disturbed, they are apt to be observed abroad feeding or at watering places any time of the day but rarely in open large forests.

Arizona white-tails are the common prey of mountain lions and bobcats since their chosen habitat is usually headquarters for these skilled deer destroyers. These little deer depend on the rugged character of their dwelling places and their ability to conceal themselves in cover rather than on long distance running, so characteristic of the larger white-tails. No doubt complete control of predatory animals would have a marked effect on the increase of these deer.

DISTRIBUTION:

The range of the Arizona white-tails in the State is confined to the extreme southwestern portion. I have observed them in all of the timbered and wooded mountainous sections, west of the Rio Grande, and from the Mexican boundary to the heads of the San Francisco and Tularosa Rivers, but never east of the Rio Grande. Some hunters claim, however, that they occur sparingly in the Sacramento Mountains.

I have seen the Arizona white-tails most commonly and observed their shed horns most numerously along the rims and mesas adjacent to the middle Gila River. One observes their tracks and hears them dash away under cover more commonly than one sees them since they can easily scoot about and keep out of sight when they desire to do so.

ENEMIES:

In the past, mountain lions have been the most serious natural enemy of the Arizona white-tails since they both occupied the same range, but since these depredators have been brought fairly well under control losses through this source are not as serious as formerly. Wildcats are now probably the most serious natural enemy of these deer, destroying many young; but coyotes are a close second, killing both young and adults. When these natural enemies are better controlled, Arizona white-tails should become far more numerous than they now are. Golden eagles probably kill some fawns of this species, but since this deer is a lover of brush and canyons, this enemy may not be serious.

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SANDHILL WHITE-TAILED DEER
Present Range
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GAME AND FISH
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SANDHILL WHITE-TAILED DEER

(Odocoileus texanus?)

The topography and general character of its range seem to demand that the white-tail which inhabits the sandhills in the eastern section of the State, be considered separately from the other white-tails, therefore, I have designated it as the "Sandhill White-Tailed" Deer.

The need for protecting the white-tail in this area is evinced by the fact that no more than fifty or seventy-five individuals remain from the great numbers that used to inhabit the hundreds of thousands of acres of sandhill country, lying east of the Pecos River. The same country supplies the restricted home of the prairie chicken in the State. Since it cannot be used for agricultural purposes, its greatest value lies in its possibilities for producing game with grazing of domesticated animals.

To permit this deer to become exterminated there would be a serious matter since no other deer is so suited as this geographic race to the unusual type of country inhabited. By long adaptability it is at home in this treeless environment, while any other deer that may be introduced would probably drift away in an effort to find type of country such as they have occupied.

The history of the passing of these deer has been a tragic one. Remnants of bunches of the animals survived here and there despite unrestrained hunting and nowhere was interest enough shown to save them from extermination. At the Lane Ranch, northwest of Tatum, a lone buck survived its more unfortunate mates for several years. It finally came near the ranch and lived in the horse pasture where it received protection from persistent hunters, but eventually it too met the fate of its kindred. North of Logan, in Harding County, a lone buck managed to survive its kind for several years, but it was finally shot, thus completing the process of extermination in that excellent deer range.

Until within the last few years, the sandhill white-tails survived in considerable numbers in the southeastern corner of the State, east and southeast of Carlsbad, where they were formerly very numerous. While conducting my survey early in 1926 I looked over this country and failed to find a trace of deer and was advised by ranchmen that none remained. More careful observation, however, disclosed the fact that a few head still remain in that section.

DISTRIBUTION:

So far as I have been able to determine the only sandhill white-tails that remain are in eastern Chaves County, near the Caprock and east of Carlsbad. The number of deer ranging both north and south of the Roswell-Tatum Highway is probably less than fifty. Refuges are being established to conserve this remnant which, with the support of favorable public sentiment, should save the animals from total extermination.

The shinnery which in some localities covers the sandhills, east of the Pecos and between Portales and the Texas line, furnishes a favorable environment for the deer. This little oak which grows high and rather thick in this locality also produces the largest acorns of any New Mexico oaks. They supply the deer with an excellent quality of food. North of Portales, extending to Union and Colfax Counties, a species of sand sumac or squaw brush replaces the shinnery in an extensive sandhill district which also supplies the deer with needed cover. The sandhill deer should be restored to all of this territory, thereby perpetuating a fine native species and giving the sportsmen of eastern New Mexico their own big game.

ENEMIES:

It scarcely seems necessary to constantly remind readers that directly and indirectly so-called civilized man is the supreme destroyer of valuable wild life; there is no getting away from this fact. The disappearance of the sandhill white-tail is a striking example of man's killing proclivities where the victims are unable to evade him.

Coyotes are no doubt a very serious enemy of the remaining sandhill white-tails since they make their inroads largely on the young animals. If the animals that remain are given absolute protection in refuges they should increase their numbers rapidly and spread throughout their former haunts.

PRONG-HORN ANTELOPE

(Antilocapra americana)

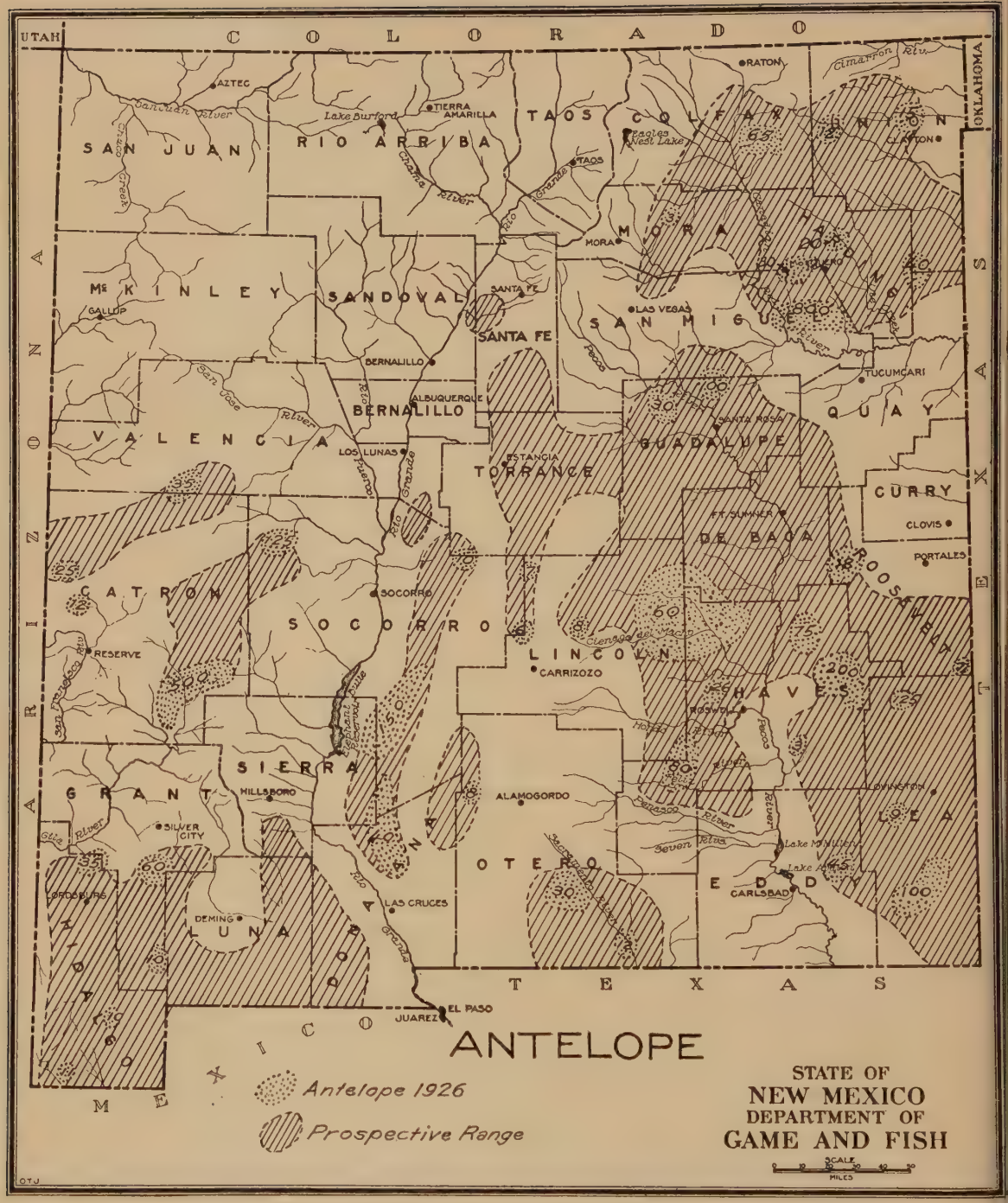
The prong-horn antelope is a distinctive North American species, being endemic to the northern half of this hemisphere. It is the fleetest and among the most interesting inhabitants of the North American plains. Formerly antelope were abundant on practically all of the open plains country of New Mexico, but because of exposure to their most fatal enemy, civilized man, they have been shamefully destroyed.

Fortunately, New Mexico still has a sufficient number of antelope so distributed that reestablishment of the species is possible. Millions of acres of treeless lands in New Mexico are suited to nothing so much as the grazing of domestic animals and antelope. Antelope should now be restored to these low-valued acres because in the not far distant future they can be made one of the most valuable products of such lands. Nowhere is the year around climate better suited to their welfare.

Homesteaders, often confronted with extreme poverty but with an excess of idleness, managed to remain on merely grass lands long enough to exterminate most of the antelope. Since the futility of men trying to eke out an existence on a few acres of this low valued land is established and the land has been returned to use for grazing, it is the duty of the sportsmen and State Game Department officials to reestablish antelope.

Private land owners in recent years have assisted materially in the protection of antelope and today the largest herds are on such lands or on lands utilized by ranchers who took an interest in protecting them. The opportunity for accomplishing something really worth while in the restoration and conservation of antelope, however, awaits the action of organized sportsmen. There are in the State 16,222,744 acres, more than 20 per cent of the State's area of unappropriated public domain. Much of this land has suffered from efforts at unwise utilization, its value badly deteriorated and the game destroyed. Through a lease law or other means of judiciously utilizing these lands, with provision for wild game protection, the antelope restoration problem would be largely solved.

Much of the unappropriated public domain and State owned land is admirably suited to the antelope and they interfere but little, if at all, with the grazing of domestic animals. By making game protection and range conservation incumbent on lessees of public domain or State lands, the value of such lands would be immensely enhanced to the user as well as the public. With such provisions, in addition to the conservation policies being put into effect on National Forests, artificial means of restocking would have to be resorted to only locally on isolated areas. If given absolute protection for a number of years, game in most sections will attend to its own distribution. Aroused public sentiment and support are the best means of accomplishing this end.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Gila River
San Francisco River
Seven Rivers
Lake McMillan
Lake Arthur
Penasco River
Hondo River
Ojo Caliente
Ojo Caliente
Ojo Caliente

Under normal conditions antelope are a prolific species, two young usually being born. At the age of ten months the young can hardly be distinguished from the adults when observed in wild bands. In 1926 there was a good increase in the number of antelope in the State and fewer than usual were killed. In many sections during the year I noticed groups of three to five individuals far from the established bands, indicating a tendency to reinhabit additional range. Especially has this been observed in the Pecos Valley. This tendency on the part of the antelope should be encouraging to the sportsmen and every citizen of the State and invite determined action and a definite campaign to PROTECT AND RESTORE THE ANTELOPE.

DISTRIBUTION:

At the present time the antelope population of New Mexico comprises approximately 2,950 animals in 39 bands and groups of bands distributed over 22 of the 31 counties of the State. In some cases, on extensive areas, as the Gila drainage of the Datil National Forest, on the Bell and adjacent ranches, and area northwest of Roswell, several bands of antelope are grouped and mapped as one herd.

On the distributional map I have indicated the main bands, approximate number to the band and the most suitable territory on which the animals should be reestablished. While a few small bands may be omitted, the map, as a whole, I believe, is a fairly reliable guide to the antelope now in the State.

ENEMIES:

Antelope, as a rule, are not confronted with as many natural enemies as are forest and mountain dwelling species of game. The coyote is no doubt the antelope's most serious enemy since it preys extensively on the young, as well as on the adults when, as result of poor range conditions, their vitality is reduced.

Extreme drought in some localities has at times seriously menaced the existence of antelope, but such danger is usually the result of excessive grazing. Antelope are hardy animals and when they die of starvation, range conditions are serious. Lack of nourishment, however, may prevent the mother from raising her young. In some of the higher elevations, for example, on the head of the Gila River and on the San Augustine Plain winters with much deep snow sometimes menace them. Surplus animals should be utilized from such elevated areas in order to avoid excessive losses, should an extremely severe winter occur.

Photo by E. E. Pope

PRONG-HORN ANTELOPE

Exclusively a North American antelope which has been subjected to shameful persecution

Photo by M. P. Skinner, Courtesy U. S. Biological Survey

MOUNTAIN SHEEP ON THEIR NATIVE RANGE

One of the finest of all game animals, almost exterminated in New Mexico as result of persistent illegal killing

MOUNTAIN SHEEP OR BIGHORN

The value of big game to the sportsmen is rated largely by the scarcity of the species and the difficulties encountered in obtaining it. By such rating the mountain sheep or bighorn stands out conspicuously. This handsome athlete, dweller of the crags and canyons, has been more earnestly and persistently hunted than has most of our other big game, with the result that it has become exterminated over the greater part of its range.

The value of mountain sheep to the sportsmen and the State may be expressed in absolute terms. Their flesh is of the finest; as trophies, the heads cannot be excelled and their chosen habitat is such that it is practically valueless for other purposes. Therefore, by reestablishing these fine animals and maintaining them on all suitable range, the State has all to gain and nothing to lose.

In treating the New Mexico mountain sheep, I have considered two forms—the Mexican subspecies, of the more desert ranges of the southern portion of the State, and the more northern form or the true bighorn, which is no doubt best suited to the higher and more heavily timbered mountains of the northern section. Evidently the animals were formerly so distributed. Mountain sheep should be restored to their respective ranges. It is very probable that they will thrive on areas as designated for the separate forms on the two maps.

MEXICAN BIGHORN (Ovis mexicanus)

The Mexican bighorn inhabits the desert mountain ranges of southern New Mexico, southern Arizona and northern Mexico. Neither the intense heat of summer nor drought appears to affect it seriously. From the hardy cacti, yucca and other desert plant life of its habitat, it seems to obtain the necessary food, and the juices from such plants no doubt substitute for water.

In New Mexico the Mexican bighorns have made their last stand in the most broken and almost inaccessible mountains. The rugged character of their retreats and their ability to evade man with the gun, alone, have stayed their extermination. Due to the remote and rugged character of their habitat, not even the ranchmen when so inclined were in a position to render them protection when extermination seriously threatened. Their habitat, for the most part, is wasteland which is not utilized for grazing, therefore the sheep had to make their fight for existence unnoticed by most men. Fortunately, in three sections of the State in their fight for their existence they have been the victors with the result that the prospects are now encouraging for their protection and increase. Refuges have recently been established and the public is showing earnest concern in their absolute protection.

DISTRIBUTION:

A safe remnant of mountain sheep remains in the Guadalupe Mountains of the southeastern portion and in the Big Hatchet Mountains, in the extreme southwestern section. The Guadalupe sheep range in both Texas and New Mexico, and

UTAH
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UNION
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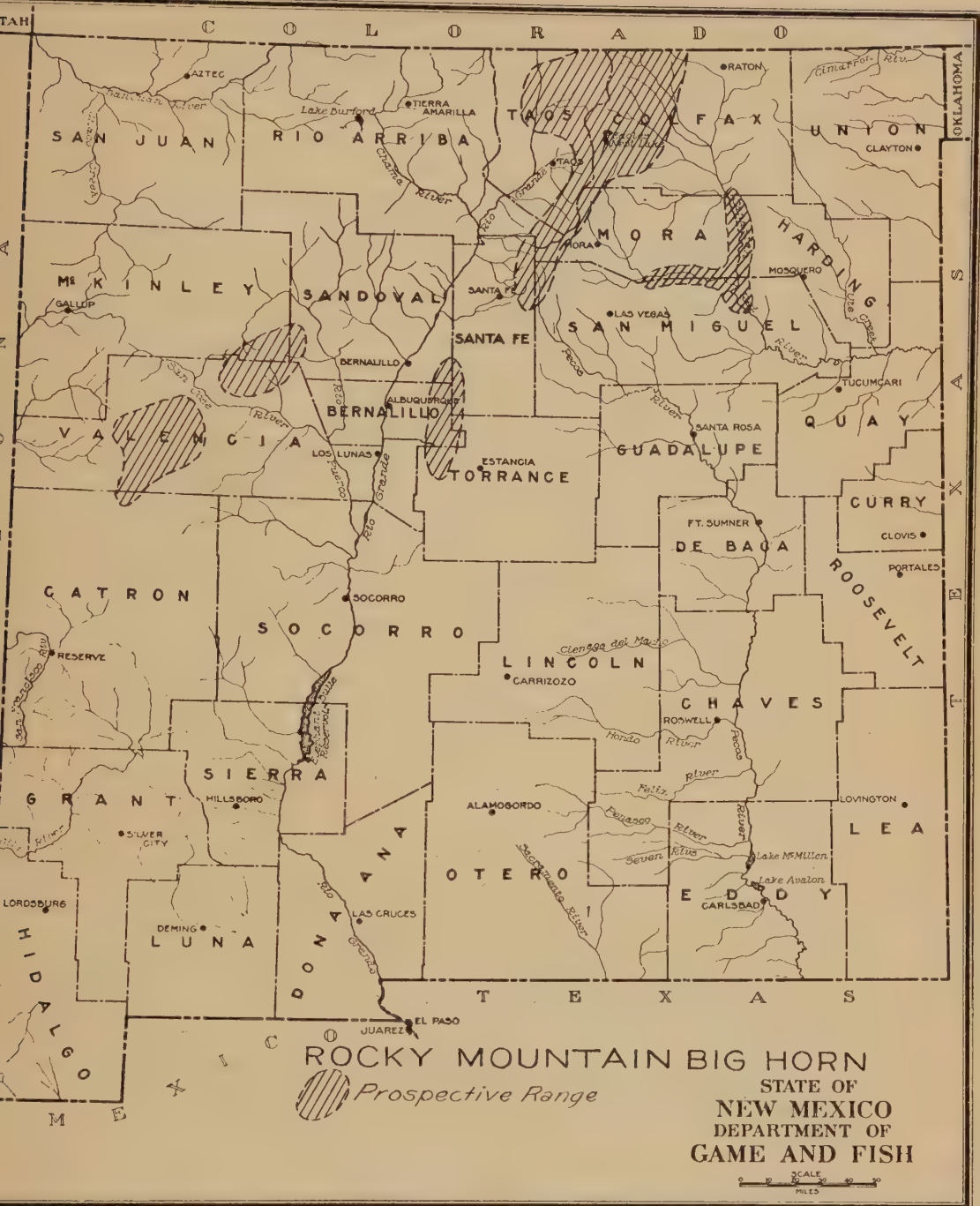
HARDING
Mc KINLEY
SANDOVAL
SANTA FE
SAN MIGUEL
BERNALILLO
VALENCIA
QUAY
GUADALUPE
TORRANCE
CURRY
DE BACA
ROOSEVELT
CATRON
SOCORRO
LINCOLN
CHAVES
SIERRA
GRANT
LEA
OTERO
EDDY
LUNA
DONA ANA
HIDALGO
AZTEC
TIERRA AMARILLA
Lake Burford
Eagles Nest Lake
RATON
Cimarron Riv.
CLAYTON
TAOS
MORA
MOSQUERO
LAS VEGAS
TUCUMCARI
SANTA ROSA
GALLUP
BERNALILLO
ALBUQUERQUE
LOS LUNAS
ESTANCIA
FT. SUMNER
CLOVIS
PORTALES
SOCORRO
RESERVE
CARRIZOZO
ROSWELL
HILLSBORO
SILVER CITY
ALAMOGORDO
LOVINGTON
Lake McMillen
Lake Avalon
CARLSBAD
LORDSBURG
DEMING
LAS CRUCES
EL PASO
JUAREZ
MEXICAN BIG HORN
Occupied Range
Prospective
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES



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those of the Big Hatchet herd pass back and forth between Mexico and New Mexico; but when not molested by hunters, they appear to prefer the New Mexico mountains. There is also a remnant of probably 35 head in the San Andres Mountains.

It is highly desirable that the main portion of the Guadalupe Mountains, from the Carlsbad Cavern, south to the point of the mountains in Texas, be made a permanent mountain sheep sanctuary and nature wonderland. In order to do this, the area should be set aside as a national park or a wilderness area and left in its natural state, except for saddle-horse and pack-animal trails. This is one of the most interesting, rugged and picturesque mountain ranges of the country, and is of little use to the State for grazing or other economic purposes; but as a mountain sheep sanctuary and a public reservation, it is of prime importance. There is ample over-flow range both in New Mexico and Texas for surplus game and by establishing such a reservation, the citizens of both of these States would be creating a lasting monument of beauty and interest.

Reestablishment of mountain sheep in the southern section of the State, if the animals obtain proper protection, will no doubt occur through natural processes; but artificial means, by capturing the young animals, are practicable. No doubt mountain sheep could be best raised and established in new range by the use of Spanish goats as foster mothers, which at first could be placed with the young sheep wherever they were released.

ENEMIES:

The Mexican mountain sheep has several serious natural enemies which must be brought under control before any marked increase in numbers can be expected. Named in order of their destructiveness, these enemies are golden eagles, mountain lions, coyotes and wildcats.

Golden eagles are now perhaps the most serious enemy of young mountain sheep. Unfortunately, these majestic birds are most common about the lofty, treeless mountains, the main retreats of the sheep. They nest and raise their young on the cliffs in the midst of the home of the sheep and unfortunately have their young to feed at the time the lambs are small. That the lambs are a temptation to them at this time is evident. I have noted that these lambs, as with domestic lambs, spend much of their time lying down, while the mother sheep grazes about, often some distance from the young, thus giving the eagle ample opportunity to swoop down and pick them up. Considering the number of these great birds on and about the Guadalupe and Big Hatchet Mountains and the ease with which they locate and capture their prey, it is surprising that the sheep raise any young.

Extermination of golden eagles is not desired; but where they become numerous, their numbers should be reduced. This is logically the duty of the Federal and State hunter force, as well as of the State game wardens, with sportsmen cooperating.

HAUNTS OF THE MOUNTAIN SHEEP

Upper: Scene in the San Andres Range
Lower: Big Hatchet Mountains, taken from the Cienega to the west

As a rule, coyotes do not seriously menace mountain sheep in their strongholds of caves and precipitous cliffs, but where the sheep occur in the slopes and foothills, as they do in their Big Hatchet range, the coyote is a serious enemy. Wildcats are probably a greater enemy of young sheep in their rough harbors than are coyotes. Mountain lions are a deadly enemy of mountain sheep of all sizes but, fortunately, these depredators are no longer common in the sheep range.

ROCKY MOUNTAIN BIGHORN (Ovis canadensis)

No doubt the Rocky Mountain Bighorns are the sheep that formerly occurred in northern New Mexico, however, they were exterminated several years ago. These sheep made their last stand in the State about the Truchas Peaks in the Sangre de Cristo Range. Old horns and heads, seen at various places on the Sangre de Cristo Range, as well as records of former occurrence of the sheep in other localities, indicate that they were formerly rather widely distributed.

As with the Mexican form, the more northern relative is content with range which has little or no economic value to man. New Mexico, like all other states where mountain sheep occur or have occurred, should restore all suitable ranges to this noble American game animal. Such restoration, obviously, will require expenditure of funds and the services of skilled men, but they should be included in the Game Department's future game restoration program.

Photo Pillsbury Studio

THE LURE OF EVERY ADVENTUROUS HUNTER

Bears lend a distinctive flavor of adventure to any big game cover

BEARS

(Ursus)

The popularity of bears as game animals, in New Mexico, won for them during the 1927 legislative session a place on the list of game under legal protection. As an indication of the growing sentiment in behalf of bears, the legislation thus favoring them was enacted with practically no opposition, however, it carried a clause permitting the killing of individual bears which become destructive to livestock.

As a group, bears are not livestock killers but individuals, especially among the grizzlies, occasionally vary from traditional habits and become serious destroyers of sheep and cattle. Poverty stricken ranges, as result of excessive range utilization, and drought often render their usual food so scanty that out of need bears become killers; hence, as respects losses from bears, forage conservation would result in increased saving of cattle and sheep. Since bears feed on carrion, they are frequently the victims of circumstancial evidence. Guilt as to having been the killer of livestock is often erroneously charged to them.

These habitants of the mountains and forests impart a touch of the primitive and a flavor of romance that nothing else can replace. Their absence would take away one of the most interesting phases of the original wild life that all would regret.

DISTRIBUTION:

Black and brown or cinnamon bears, color phases of the same species, are still widely distributed in New Mexico. Unfortunately, the more predatory habits of the grizzlies have resulted in their being almost totally exterminated in the State. Revised policies as affects grazing in the higher portions of the mountains, where these bears make their home, may bring about a situation which will permit a few grizzlies to survive. All true sportsmen of the State hope that such a situation will develop.

The black and brown bears are rather evenly distributed throughout all of the more extensive mountainous regions of the State and for this reason they should, under proper protection, rapidly gain in numbers and should soon reoccupy all of the mountainous ranges they formerly inhabited.

ENEMIES:

That bears have few, if any, enemies in the State other than man scarcely seems necessary to state. Where forage, however, becomes scarce, as result of overgrazing, followed by drought, bears are often confronted with such a scarcity of their usual food that they become very poor. Indirectly, man thus interferes with their welfare. On the other hand, the seasons are few when there is not some form of mast somewhere, and bears are unexcelled in locating remote or isolated areas which are favored with an acorn, pinyon or juniper mast. Whether this is done by scouts or through wide and intensive searching or through some other means is hard to determine; however, the whole bruin population soon locates the best feeding places.

UTAH
COLORADO
OKLAHOMA
TEXAS
ARIZONA
MEXICO
AZTEC
San Juan River
Lake Burford
TIERRA AMARILLA
RATON
Cimarron Riv.
CLAYTON
Eagle Nest Lake
TAOS
COLFAX
UNION
SAN JUAN
RIO ARRIBA
Rio Grande
Canadian River
MORA
HARDING
MOSQUERO
Ute Creek
McKINLEY
SANDOVAL
SANTA FE
LAS VEGAS
SAN MIGUEL
Pecos River
GALLUP
BERNALILLO
TUCUMCARI
San Jose River
ALBUQUERQUE
BERNALILLO
VALENCIA
Puerco River
Rio Grande
LOS LUNAS
SANTA ROSA
GUADALUPE
QUAY
ESTANCIA
TORRANCE
CURRY
FT. SUMNER
DE BACA
CLOVIS
PORTALES
ROOSEVELT
CATRON
SOCORRO
Ciengia del Macho
LINCOLN
CARRIZOZO
CHAVES
ROSWELL
Hondo River
Pecos River
Felix River
Bonito River
SIERRA
GRANT
HILLSBORO
LOVINGTON
LEA
Gila River
SILVER CITY
ALAMOGORDO
Penasco River
Seven Rivs
Lake McMillan
Lake Avalon
OTERO
EDDY
CARLSBAD
LORDSBURG
DEMING
LUNA
Rio Grande
LAS CRUCES
Rio Grande
EL PASO
JUAREZ
HIDALGO
BLACK BEAR
Occupied Range
STATE OF
NEW MEXICO
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SCALE
MILES

COLLARED PECCARY

(Pecari angulatus)

The collared peccary, known in Western Texas and its New Mexico range as the muskhog or javelina, (pronounced havalina) the latter being the Mexican name, is one of two species of wild pigs that inhabits North America, the present species alone occurring in the United States. The peccary, when molested, emits a strong odor from its musk bag which is located well up in the middle of the rump. The name muskhog is therefore aptly applied to it.

It is a most interesting and, when not disturbed, a harmless animal whose presence conflicts little, if any, with either wild or with domesticated animals. Its food consists of roots, herbs, fruit, cacti, acorns and other mast and berries. The flesh, although strong, is sometimes eaten; but its value to the sportsman lies in the sport of hunting as well as in the trophies thus gained.

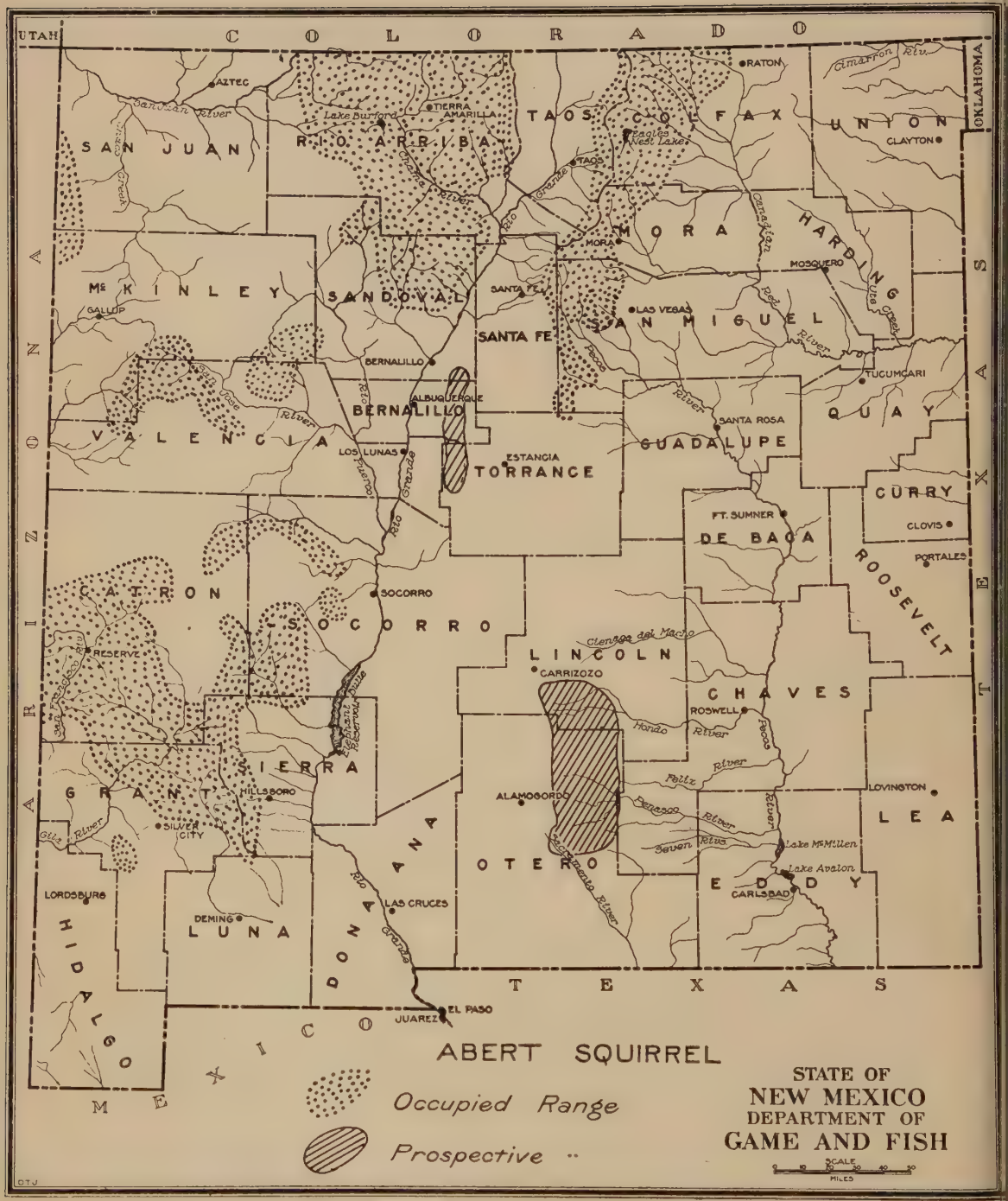
The peccary, although not a large animal, weighing 60 to 75 pounds, when attacked, has few equals for self defense. With its powerful tusks and lightning movements it can quickly cut a dog to pieces. A bunch of peccaries when at bay present such a scene of vicious, fighting energy that few foes dare press them.

DISTRIBUTION:

Peccaries formerly occupied suitable range on a narrow zone all along the southern border of the State, from Arizona to the Texas line, east of the Pecos. They have, however, been persistently hunted and killed until only a few remain. They are now most numerous in the extreme southwestern corner of the State and a few survive in the sand country, east of Carlsbad, where they were formerly abundant. These strange and interesting animals should be well protected. If not given absolute protection, their extermination seems inevitable. In addition to conserving the few remaining peccaries in refuges, a close season of from four to six years is recommended for their future protection.

ENEMIES:

As already stated, peccaries are physically capable of defending themselves against most of their enemies in New Mexico except man with his gun. Drought seems to have no adverse effect on them since they utilize the hardy cacti and other desert plants to meet their needs at such times. Compared with domestic hogs, peccaries are not prolific animals, one and two young being born. Even where little molested by man, they probably would not become abundant on their limited New Mexico range.



ABERT SQUIRREL

Occupied Range

Prospective

STATE OF
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DEPARTMENT OF
GAME AND FISH

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TREE SQUIRREL

(Sciurus)

Three species of tree squirrels inhabit New Mexico; two are edible, the Abert and the Arizona Gray. The third, the little red squirrel or chickaree, is so small it is not generally considered a game animal. Various forms of rock squirrels are found throughout the State, but these are usually regarded as pests. During the game survey a fourth species of tree squirrel, the Apache squirrel, (Sciurus apache) which is a tree dweller and occurs in Mexico, was killed within two miles of the New Mexico line, opposite the Lang Ranch, in Hidalgo County. This form which is a close relative of the fox squirrel occurs in the State at rare intervals.

All of the squirrels are more or less the prey of natural enemies, yet by their alertness and skill in tree climbing, they are able to evade their enemies remarkably well. Goshawks, however, prey on them, and wildcats and coyotes are often successful in obtaining a feed of squirrel.

ABERT SQUIRREL (Sciurus aberti)

The Abert squirrel, the most beautiful squirrel of New Mexico if not of the entire country, is a dweller of the yellow pine forests over much of the State. It is locally referred to as the pine or tassel-eared squirrel. It is represented by both the ordinary light or gray form and a black or dusky color phase. These dark forms are usually in certain areas and not distributed throughout the habitat of the species.

Abert squirrels lend an air of distinction and interest to the forests of the State. At times they are abundant and then for a period of two or three years they become scarce and are little in evidence over wide areas. I have never seen any indication of migration on the part of this species such as sometimes occurs among squirrels in the eastern states.

These graceful and alert squirrels are expert tree climbers and are highly skilled in leaping among the tree tops. They are about the size of the eastern gray squirrel but of a more robust form. Their ear-tufts stand up conspicuously and the long plume-like black and white tail, which is always in evidence, appears to be the pride of these saucy squirrels. A wide cinnamon stripe extending along the back tends to still further adorn these beautiful creatures.

The typical color phase of the Abert squirrel occurs throughout the New Mexico range but prevails almost wholly in the northern section of the State. In this region, their under parts are white but the upper parts of the body are light gray and the cinnamon back stripe is much less defined than on the animals farther south. In the Black Range, the prevailing color of the squirrel is dark, almost black, with the white undermarkings and a well defined back stripe. Entirely black, or melanistic individuals with no white markings on the body are often seen. In the

ABERT OR TASSEL-EARED SQUIRRELS

Showing both the gray form and the black or dusky color phase

Left: Arizona Gray squirrels. Right: Red squirrels.

Photos of mounted specimens in State Game Department Collection.

San Mateo Mountains, separated by only a few miles from the Black Range, I found that 85 per cent, or possibly more, of the squirrels are of the black phase. The occurrence of the dark phases of Abert squirrel in New Mexico is much along the lines of the occurrences of the black phase of the gray squirrel in the east.

Abert squirrels feed extensively on pine twigs. They clip the tips from the limbs, letting them fall to the ground, and then make a second clipping so as to get two or three inches of the twig from which they gnaw the outer bark, and eat the tender inner bark. In fall, winter and spring this inner bark constitutes a considerable part of their food. Even when acorns or pine nuts, both favorite foods, are available, they often resort quite freely to the pine bark diet. So common does this pine topping habit sometimes become that Forest Service officials and ranchmen seriously complain owing to the supposed injury to the trees, and the serious effect on unborn calves where cows feed on the fallen needles. These squirrels are also fond of the nuts of the pine which they begin to cut from the cones long before they ripen.

DISTRIBUTION:

The Abert squirrel loves the yellow pine forests hence its principal habitat lies between 6,500 and 8,500 feet elevation. Extensive yellow pine forests do not occur below 6,500 feet in the State, and not often have I observed these squirrels below the pine belt except that they are common in pinyons immediately adjacent to the yellow pines. They also often venture above the yellow pine, among the spruce and fir forests but do not make a permanent abode in such places.

Abert squirrels occur throughout the pine forests in the northern section of the State but are apparently nowhere common. They are, by far, more common in the southwestern section of the State, on the San Francisco, Gila and Mimbres River drainages, and on the San Mateo Mountains, west of San Marcial. They are also quite common in the Mt. Taylor and Zuni Mountain sections. For some reason this species is not found east of the Rio Grande, south of Albuquerque, its southern limit being the end of a tongue of elevated pine lands, an offshot from the Sangre de Cristo Range, about 45 miles south of Glorieta.

ARIZONA GRAY SQUIRREL (Sciurus arizonensis)

The Arizona gray squirrel occupies a limited range in southwestern New Mexico, but is fairly common where found and appears to be becoming better established from year to year. In size, color and movements, it resembles the eastern gray squirrel. In New Mexico this squirrel confines itself largely to the deep, watered canyons and appears to favor the sycamore and walnut trees. It also lives in tree hollows, high up, rather than in nests constructed for dwelling places among the branches.

This squirrel, like others, has a varied diet; but it feeds almost exclusively on walnuts after these nuts become matured. Its feet and mouth are always heavily

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FARMINGTON
GALLUP
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Lake Burford
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Cimarron Riv.
CLAYTON
MORA
MOSQUERO
LAS VEGAS
TUCUMCARI
SANTA ROSA
Pecos River
Red River
Ute Creek
San Juan River
Chama River
Rio Grande
Canadian River
ALBUQUERQUE
BERNALILLO
LOS LUNAS
San Jose River
Rio Puerco
Rio Grande
ESTANCIA
FT. SUMNER
CLOVIS
PORTALES
SOCORRO
RESERVE
Gila River
Middle Gila River
Ciengga del Macho
CARRIZOZO
ROSWELL
Hondo River
Pecos River
Felix River
Penasco River
Seven Rivers
Lake McMillen
Lake Avalon
LOVINGTON
CARLSBAD
ALAMOGORDO
Sacramento River
HILLSBORO
SILVER CITY
LORDSBURG
DEMING
LAS CRUCES
Rio Grande
EL PASO
JUAREZ
ARIZONA GRAY SQUIRREL
Natural and Occupied Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES
O.T.J.

stained with the juice of the green walnut shells before the nuts ripen. Like the other squirrels, it digs in the ground a great deal to obtain roots and buried nuts.

DISTRIBUTION:

So far as I have been able to determine, the Arizona gray squirrel in New Mexico is confined to the San Francisco River drainage. It ranges upward to an elevation of about 7,000 feet, about the limit of the Arizona sycamore. In but few instances have I observed this squirrel far from these beautiful spreading trees.

This squirrel will probably continue to restrict its habitat in the State to that of the sycamore, and its range will not be extensive, as this tree, in New Mexico, is confined to the San Francisco drainage, the Gila River, to a point above Cliff, and the dry washes and watercourses of the Animas and Peloncillo Mountains.

RED SQUIRREL (SCIURUS FREMONTI NEOMEXICANUS)

This chattering, playful little squirrel is a common species in the high mountains of New Mexico. It is a dweller of the fir and spruce forests of the Canadian zone, and is rarely seen below the fir and spruce belt. Because of its diminutive size and remote habitat, it is not of any considerable value as a game animal.

The chickaree, as the little red squirrel is often called, is an industrious little worker. Its main home is usually in the dense forests. Its feeding place usually consists of a half decayed spruce or fir snag, honeycombed with holes and retreats for the squirrels. About such snags the discarded shells of the spruce and fir cones are found spread about on the ground, often in great heaps, as a result of having been used for years as a storage and feeding place.

The red squirrel constructs a compact nest of twigs, grass and moss in trees. These nests are snug and warm, as they must be, to protect it and its young from the storms and intense cold that prevail in its high habitat during winter.

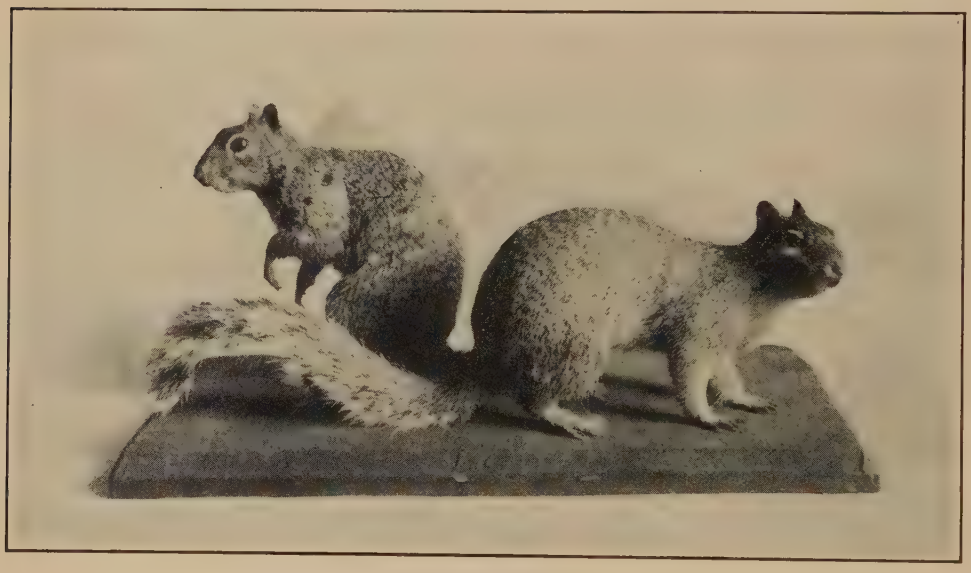
DISTRIBUTION:

Red squirrels are resident throughout all of the higher and heavily timbered mountain ranges of the State. They are especially common in the mountains of the northern area, but are also numerous in the White and Sacramento Mountains, and in the Black and Mogollon Ranges of the southern section. This distribution is governed wholly by elevation, since spruce and fir forests are found at high elevations only. Their numbers are little affected from year to year as hunters and drought do not seriously molest them, and they are capable of protecting themselves against natural enemies.

ROCK SQUIRREL

(Citellus grammurus)

The rock squirrel has little or no value to the sportsmen as game, but to game birds and to the farmer's crop it is often a serious menace. The digger squirrel, as it is also known, is a large ground or rock-dwelling species, larger and more heavily proportioned than the gray squirrel and lacking the proud, bold habits of the tree-dwelling species. Its tail is long and narrower than in the gray squirrel and not conspicuously displayed as in that species. When it starts to run, it com-



ROCK SQUIRRELS

Pests rather than beneficial game animals

Photo of mounted specimens in State Game Department Collection.

monly raises and shakes its tail, only to let it drop back to its usual horizontal position. Rock squirrels are poor tree climbers and confine their climbing to scrubby or leaning trees, rarely going more than 30 or 40 feet from the ground.

The favorite home of the rock squirrel is along the lower parts of deep canyons, on rocky slopes, and about the rims of mesas. As a rule, it lives in crevices in rocks, but frequently digs its own burrows on the open slopes, usually at the roots of brush or trees or under rocks. Occasionally it makes its abode in hollow trees, not far from the ground.

In the northern area of the State this species hibernates during the entire winter while in the warmer sections, farther south, its period of hibernation is of much shorter duration.

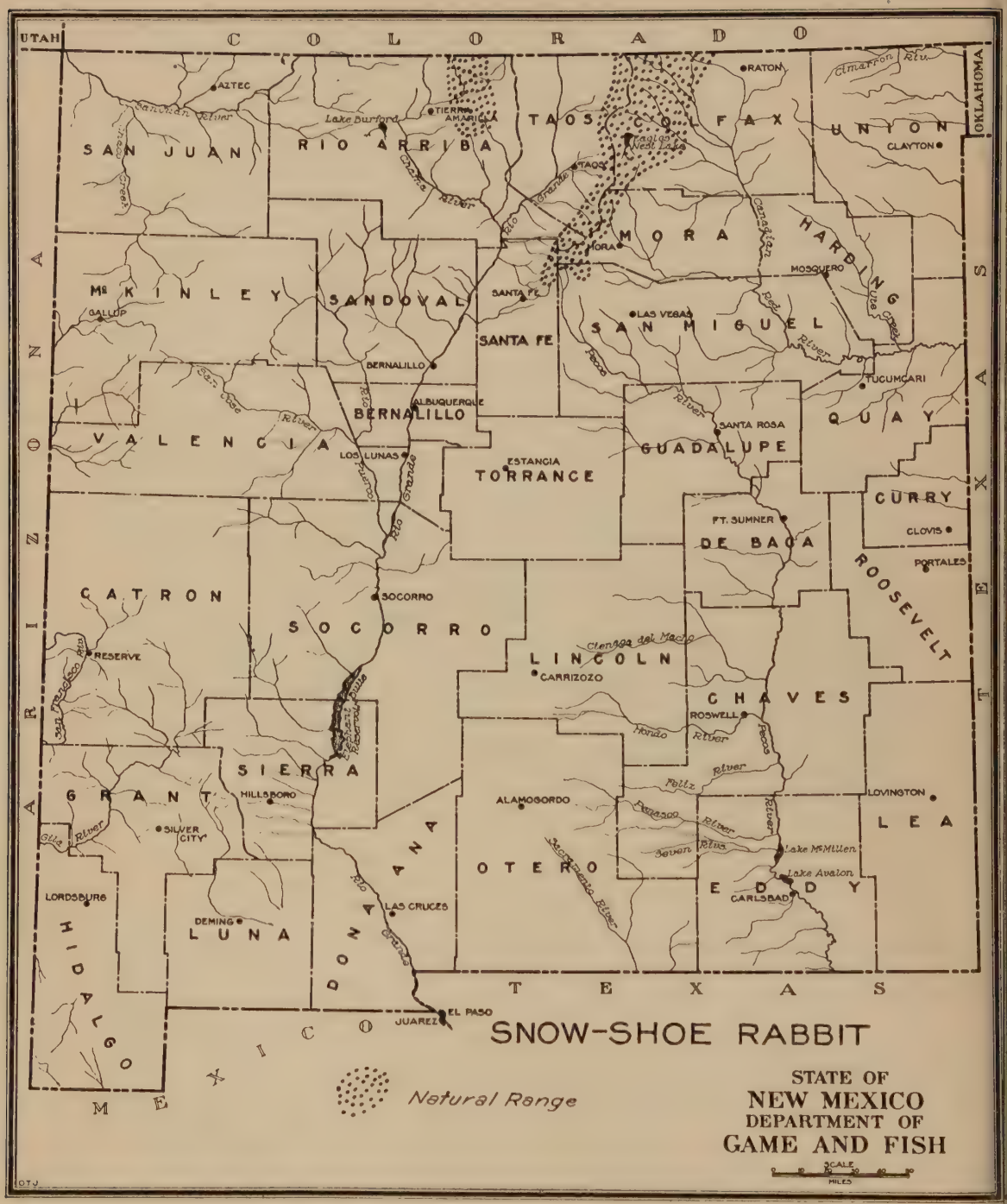
Rock squirrels, in New Mexico, frequently become serious pests about farms, where, unless trapped or poisoned, they carry off the greater part of the farmer's ripening corn. Such damage is most serious where the farms are of a narrow shoestring nature, bordered by steep, rocky canyon walls, where the squirrels find suitable and safe retreats. I have known a single farmer to trap more than a hundred of these squirrels in and about a dozen acres of scattered corn patches. Their cheek pouches serve them admirably for gathering and carrying away their food which they hoard in great quantities. They are most abundant and commit greatest damage in the southern section of the State.

The rock squirrel is also a robber of the nests of ground nesting birds and domestic fowl. So expert is it at stealing hen eggs that it is often difficult to determine the robber. No doubt it destroys eggs of quail and other game birds. It inflicts the greatest damage and annoyance about dwelling places where it lives under houses, barns and other out-buildings.

The digger squirrels deserve no protection; they may well be classed as an enemy to the interests of the farmer and sportsman. So clever are they at escaping natural enemies that comparatively few are killed by them, and they are prolific breeders for which reasons they often become abundant in localities suited to their habits. Hawks, wildcats and coyotes occasionally catch one, particularly the young, but do not make any impression on their numbers.

DISTRIBUTION:

Rock squirrels are widely distributed throughout the State, occurring practically everywhere that rocky canyons are found. Conditions, however, are most suited to them in the southern parts where, as already stated, they are most abundant.



SNOW-SHOE RABBIT

STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH

SCALE
0 10 20 30 40 50
MILES

RABBITS

No game animal is more common in New Mexico than are rabbits. There is hardly a square mile that is not at least occasionally visited by one or more species, from the lowest elevations up into the arctic zones above timberline.

Of cottontails, which are our principal game rabbits, several kinds occur, each belonging to a distinct area, covering in all the entire State. They are the principal rabbits hunted for food. Cottontails are most abundant throughout the lower sections of the State, especially in the mesquite country; but they also occur in all of the life zones, even up to the arctic, into which they sometimes venture. These

BLACK-TAILED JACK RABBIT

attractive animals should be featured more as game. Their hunting not only provides good sport, but the flesh is excellent, and where extensively hunted, the tax on other scarcer species of game may be lessened.

Snowshoe rabbits or varying hares are common in the higher areas of the Sangre de Cristo Range and are also found in the high mountainous country, west of Tres Piedras. Like the cottontails, snowshoes are an edible species and are often hunted for both sport and food. Snowshoes are found most commonly in the dense fir and spruce forests on northern slopes of mountains and canyons up to timberline; they even occur among the dwarf willows and prostrate fox-tail pine

above timberline. In winter they feed on bark and twigs, above the snow. Their brownish summer pelage becomes white with the arrival of snow in early winter, just as is their habit in their northern ranges.

The big white-tailed jack rabbit, which is the largest of American hares, is found on the high mountains both east and west of the Rio Grande, in the extreme northern section of the State, however, its habitat is very limited. I have observed this species west of Tres Piedras and also on the summit of the Big Costilla Peaks, where there is considerable treeless land.

The black-tailed jack rabbit is the common large jack rabbit or hare, and occurs practically all over the State but is especially numerous in the southern and eastern sections. It periodically becomes destructively abundant. The killing of coyotes, badgers and large, prairie dwelling hawks has had a tendency to increase its abundance with consequently increased depredations. More or less successful poisoning and trapping campaigns to control jack rabbits have been conducted in many agricultural sections. Rabbit drives or roundups, when hundreds of the animals are killed ,often furnish communities interest and excitement, and incidentally assist in protecting the farmer's crops and range forage.

Unfortunately, the adult black-tailed jack rabbits are not generally considered good food, as they are frequently poor or infested with parasites. The young, however, are excellent food and as a general rule are free from parasites so common at times among the adults.

The hunting of jack rabbits with a small rifle furnishes good sport, while running them with gray hounds is a thrilling and exciting pastime. Unfortunately, it is impracticable to run swift hounds in localities cut up by wire fences. Obviously, no hunting restrictions should be placed on the jack rabbit in the State, while any means that will assist in controlling this pest should be encouraged.

LIFE SKETCHES OF RESIDENT GAME BIRDS

The turkey, grouse and quail constitute the most important groups of resident game birds in New Mexico. One species of turkey, four of grouse, the fifth —sage grouse—having been exterminated, and four of quail now occur in the State.

The abundance of all resident game birds is dependent largely upon local conditions, especially on the presence of the necessary cover and yearlong food supply. Waterfowl and other migratory game birds, when conditions are not suitable in one locality, move on to more favorable places.

Turkeys, grouse and quail must have ample ground cover for food and for harbors in which to nest and raise their young, as well as for protection against their enemies—the elements, predatory animals, birds of prey and man. Where this requirement is denied them, extermination is their inevitable doom, even though they are not hunted by man. Consequently in any arid land like the southwest, they often are confronted with impossible living conditions.

Game birds are not only valuable as a source of recreation and as food, but as destroyers of injurious insects and consumers of seeds of undesirable weeds. In this respect quail are especially beneficial to the farmer. Most of the resident game birds respond to agricultural development, if their two basic requirements exist—shelter or cover and food. Wild turkeys soon find patches of oats or other grain planted for their benefit while the prairie and valley dwelling grouse and quail are in their element where protected brushy areas adjoin farm lands. The bob-white, by preference frequents farming areas and is a valuable asset to any farm.

Formerly when land was not considered as valuable in this country as is the case today, liberal unutilized borders were devoted to fence lines and turn-rows and many ungrazed areas were common about farms; these were appropriated by the birds as their favorite retreats. High land values and intensive agriculture demanded that these areas formerly available to game birds, be utilized. It is doubtful whether this intensive utilization, precluding not only game birds but other birds as well, is proving to be economically sound; it certainly is not so far as concerns the farmer and ranchman who must contend with insects and weed pests. If we are going to be so parsimonious that we will not share a little of the earth with our feathered friends and cooperators, we can expect to pay the inevitable penalty. In another chapter of this report I have referred to the importance of farmers leaving uncultivated and moderately grazed corners and zones along fence rows so as to provide hedges and thickets, thus creating suitable conditions for both game and non-game birds.

In no other way can we hope to have quail and other game birds in most of the reclaimed valleys. Conditions that favor game birds also furnish protection

in the form of windbreaks for growing crops and assist in sustaining the life of the soil against wind erosion. It is the business of the sportsmen to encourage and assist farmers to do the things that will help game birds.

Many reclaimed sections of New Mexico would possess ideal conditions for native game birds were it not for the lack of suitable brush and rank grass and weeds for winter cover. Trees alone do not constitute this requisite. The wonderfully developed Pecos Valley offers the best proof that no matter how favorable summer conditions, game birds cannot thrive where winter cover is lacking. In summer we see this valley as the birds need and like it but the crops and weeds serve only as temporary cover. In winter no game birds can survive in its barren fields and prairies. Often the weeds and grass are luxuriant but these are closely grazed down or burned generally at a time when the birds most need the protection from storms, migratory hawks, house cats and other enemies. Brush, weeds and grass are an absolute necessity for quail and other game birds that cannot be disregarded.

In order to correct the fault in the Pecos Valley as well as elsewhere, artificial cover of a permanent nature must be provided. Native plant life that is adapted to the particular locality must be permitted to grow. Plum, locust, Russian olive, arrowwood, tamarisk and willow in thicket form provide excellent retreats for game birds, while brushy, spreading hedges of mulberry, Osage orange and various other species adapted to the southwest, serve their needs admirably.

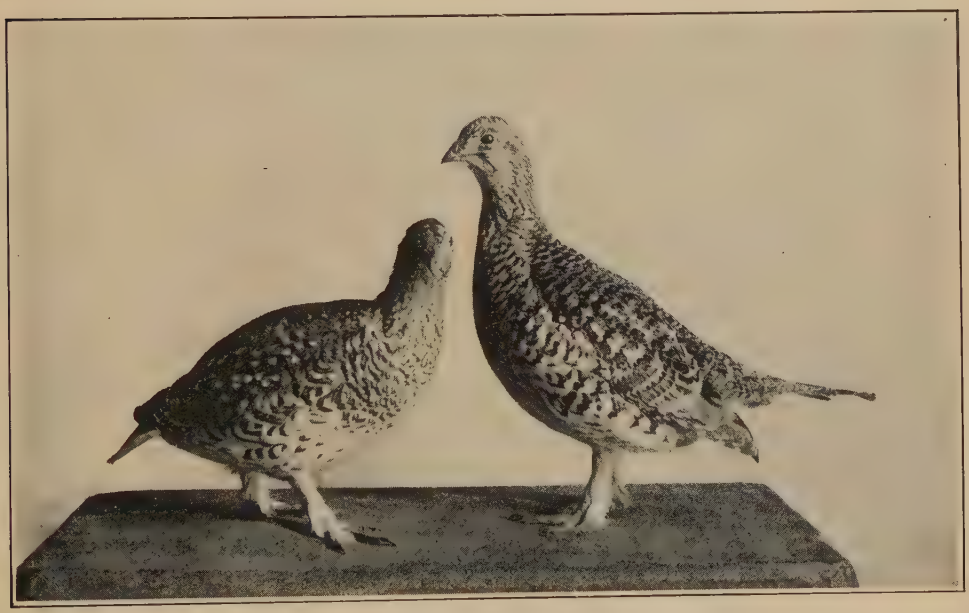
Members of the scratching group of birds, including quail, grouse and turkeys, furnish our most thrilling sport afield and the most palatable of food. Fortunately, every section of New Mexico is suitably adapted either to turkeys or at least one species of grouse or quail. So prolific are all of these species that where accorded suitable living and food conditions and protected from their natural enemies, they would soon replenish the land, where they are now scarce, or numerous only during favored seasons.

The State Game Department and the State Game Protective Association should buy or accept gratuitously plots of land everywhere and fence and conserve them as game bird sanctuaries to insure a permanent supply of birds throughout the State. Such plots, however, cannot be selected at random; they must be carefully and systematically chosen, if they are to be productive of satisfactory results.

WILD TURKEY AND GROUSE

Because of their larger size and more exacting range needs, turkeys and grouse cannot adapt themselves to all conditions suitable to quail. That these birds have survived as well as they have in the State during the long period of reckless waste is due only to the fact that the survivors were able to exist here and there in mountainous or sandhill areas difficult of access, and not because of any consideration on the part of man. Fortunately a sufficient number of birds have weathered the storm that encompassed them so that it is possible to reestablish their numbers on much of their former range under proper protection.

WILD TURKEY—AMERICA'S FINEST GAME BIRD



SHARP-TAILED GROUSE

(FOR DESCRIPTION SEE PAGE 125)

Photographs of mounted specimens in State Game Department Collection.

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LAKE AVALON
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Rio Grande
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Cimarron River
Pecos River
Canadian River
Ute Creek
San Jose River
Puerco River
Gallinas River
Ojo Caliente
Gila River
Hondo River
Felix River
Penasco River
Seven Rivers
Carrizozo
Capitan Mts.
Sacramento River
WILD TURKEY
Occupied Range
Prospective "
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
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MERRIAM WILD TURKEY (Meleagris gallopavo merriami)

The big bronze wild turkey of the Southwestern United States is the premier aristocrat of North American game birds; in fact it is not surpassed in the entire world. Our domesticated turkey is a descendant of a near relative of this superb wild species. New Mexico is fortunate in that its entire mountain system includes the natural habitat of the Merriam or mountain dwelling species and furthermore because only locally has the bird been exterminated from its former range. Its complete restoration is only a matter of determined effort on the part of the sportsmen. The sportsmen of the State are too proud of this exclusive American game bird to permit its numbers to be further reduced in any locality.

Happily the habitat of the wild turkey in New Mexico is such that economic developments should not seriously curtail its range. It is, however, dependent on its environment and this must be appreciated. Artificial conditions do not appeal to the wild turkeys, hence they do not thrive out of their natural environment. It is significant that by choice we find them in or near the yellow pine type and always where living water—springs or streams—is available. Nowhere, in the memory of the oldest citizens of the State, have turkeys been resident where pine was not in evidence. If for no other reason, the adult birds seem to insistently choose pine trees in which to roost.

The supremacy of the wild turkey as the huntsman's lure and the unrivaled value of its flesh as food are so generally recognized that extensive consideration of these subjects is not necessary. It will suffice to say that the successful turkey hunter prizes his game highly because he knows that he has matched his wits and won against game whose cleverness at foiling his efforts is unsurpassed and with a reward in a quantity and quality of flesh unequalled in any other of our game birds. These are the qualities that make these superb birds appeal to all sportsmen.

Considering the climatic conditions of their elevated range, turkeys nest early, usually laying in April. As a rule the young are all hatched by the middle of May. Nine to twelve eggs constitute the usual clutch. They usually retire to the highest and most secluded areas of their range to nest. After the young are hatched, two to three females generally unite with their broods and raise the young in one big family. The male birds take no part in raising the young, and evidently the hens hide their nests and keep the young away from the gobblers. Where ground cover is luxuriant, the birds, under normal conditions, usually succeed in raising their young. In conducting their difficult nesting activities, the female turkeys display rare foresight and courage.

Because of size of the adult bird, an abundant supply of suitable food is an important item in the life of a wild turkey in the arid southwest. This fact is proven by examples where actual starvation befalls the birds or poor condition so reduces their vitality that they become easy prey for their ever present enemies. Such extreme conditions occur especially during severe winters, with excessive snowfall, or during retarded spring.

It is doubtful whether starvation ever threatened turkeys in former times when the natural plant growth was lessened only by what was eaten by game, or other natural causes and when the birds were free to drift about to seek out the best feeding places. Often in recent years, insufficient food on their range in the early spring has prevented turkeys from breeding and nesting normally.

In New Mexico, acorns, pinyons and other pine nuts, juniper berries and a great variety of wild grass seeds, when permitted to mature, furnish the principal winter diet of turkeys. When there is a general pinyon nut crop, the food problem of turkeys for the following winter is solved. A heavy acorn crop also assures an ample supply of food for turkeys throughout the greater part of the winter. Fortunately, either pinyon forests or oaks or both are found throughout the habitat of the turkeys in the State. The Gambel oaks supply a very substantial acorn crop on which turkeys thrive.

In summer and fall there is sufficient turkey food available in the form of vegetable matter and worms, beetles and grasshoppers. Turkeys glean a substantial part of their food in the form of worms and bugs from underneath the matted pine needles which they thoroughly work especially during the winter and spring months. Most of the cultivated crops of man such as barley, oats, rye and corn, furnish turkeys a highly relished diet. Since these grains, and oats in particular, thrive in the high mountains, only their planting is necessary to lure turkeys to the feast that follows. Small patches of oats can be planted for the sole benefit of turkeys at a very nominal cost. In some localities considerate ranchmen are already following this plan. This plan of feeding wild turkeys both in and out of game refuges offers great possibilities to the sportsmen. Where domesticated animals are eliminated, not even fences are necessary around such grain plots.

DISTRIBUTION:

Formerly wild turkeys were found in all timbered mountains and mountain ranges of New Mexico. They have been entirely exterminated from only a few isolated areas—the Animas Mountains in Hidalgo County, Guadalupe Mountains in Eddy County, Gallina Mountains in Lincoln County, Magdalena Mountains in Socorro County, Sandia Mountains in Bernalillo County and Turkey Mountain in Mora County being the principal areas on which they have been killed out. Reliable information leads to the conclusion that wild turkeys disappeared from the Animas Mountains in 1903 or 1904. As late as 1910 the birds were rather common on the eastern slope of the Sandia Mountains, east of Albuquerque, and a few survived for several years thereafter. They disappeared from the Guadalupe Mountains about 1907, making their final stand near Queen, and held out only a little longer in the Magdalena and Gallina Mountains. While there seems to be no definite record of the disappearance of turkeys from the Turkey Mountain in Mora County, the name of this mountain indicates conclusively that the birds once inhabited the area and no doubt in abundance.

The most extensive and most suitable turkey range in the State and where

the birds have remained most abundant under adverse conditions is the extensive forested areas, including the Sacramento, White, Pecos and Jemez Mountains, the mountains of Colfax County and the San Mateo, Black and Mogollon Ranges.

ENEMIES:

No other American wild game is pursued by such an array of determined enemies as is the wild turkey, yet none other under natural conditions can more successfully evade its enemies. With the white man adding his skill in game extermination to that of natural enemies, it is surprising that any wild turkeys remain. The fact that they are so alert and skillful at evasion and are favored by natural protection has enabled them to exist in spite of persecution.

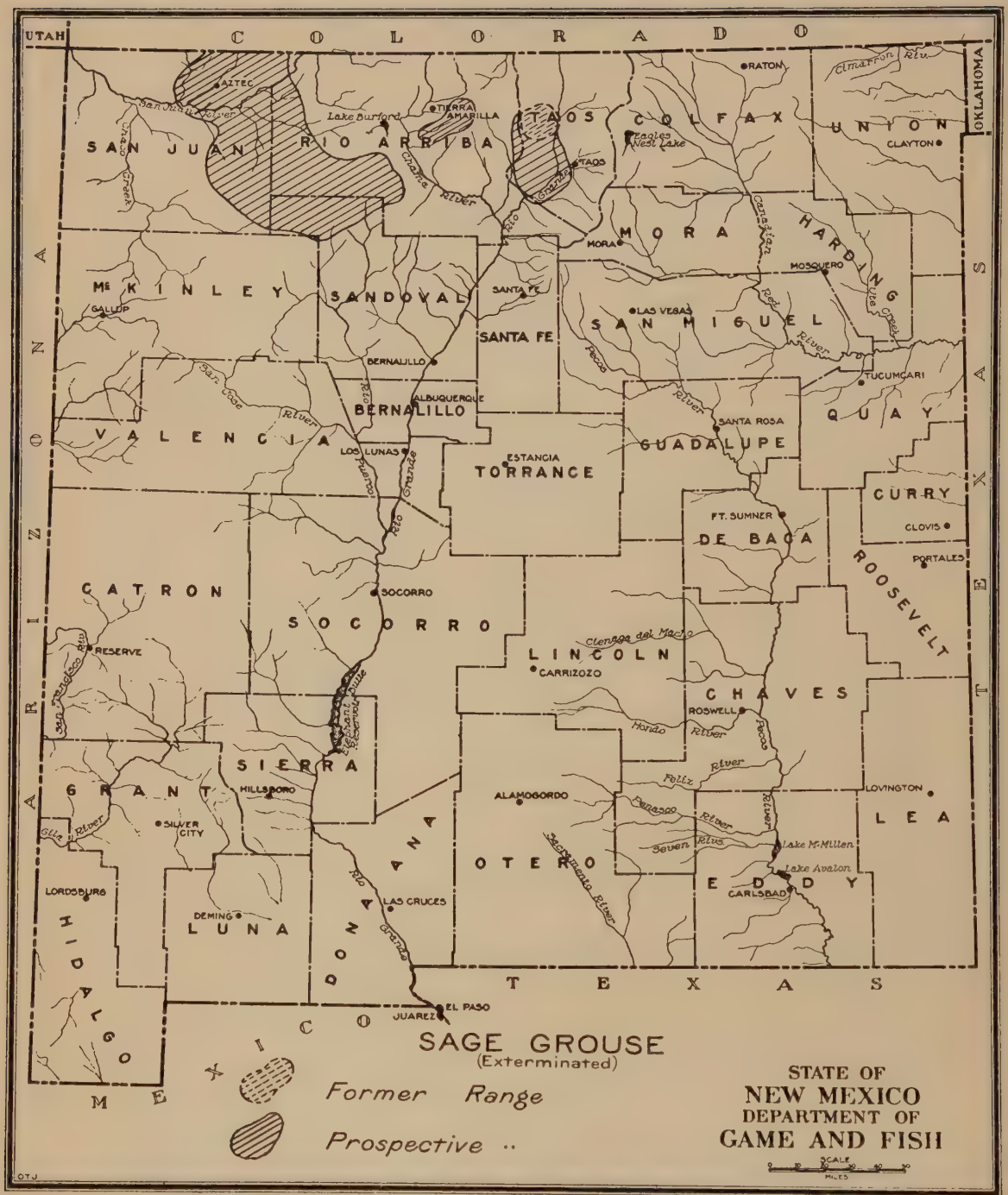
Obviously, the white man, directly and indirectly, is the greatest enemy of all wild game including turkeys. Wildcats and mountain lions are among the most serious predatory enemies of turkeys, while in recent years, as coyotes become more generally established in the forested mountains, these aggressive, tireless hunters are rivaling, if not surpassing, the wildcat's love for turkey hunting. The golden eagle is also a very serious enemy of turkeys of all ages while practically every predatory species indigenous to the range of the turkey, destroys nests, young or adults.

On both eggs and young turkeys the elements levy their tax. Snow, cold rains, storms and drought all come in for their toll. The female turkey, however, is wisely endowed by Dame Nature as is shown by her ability to frustrate the ravages of the elements. She seems to know best about requirements of nesting time, nest locations and the raising of her delicate young which are subject to injury and death from many causes. The rigid climate of the elevated range of the bird in the southwest increases these dangers even more, but by timing her laying period so that the young are hatched in the usual interim of most favorable weather, which occurs just following severe winter weather but preceding the cold rains of summer, the hen usually has an opportunity to raise her brood to hardihood during the most favorable period. That she is not always successful, however, is proven by the occasional absence of young.

I have observed that during down-pours of rain turkeys will seek the shelter of dense spruce or fir trees. While the young are generally safe in such places, continued rain will wet and chill the young birds, often causing practically all of a brood to perish.

SAGE GROUSE (Centrocercus urophasianus)

The sage grouse is the largest of the American grouse. This grouse obviously was never widely distributed in New Mexico as the big sage (Artimesia tridentata) and other species of sage in which this bird makes its home occupy only the extreme northern and northwestern sections. This grouse has been extinct in the State for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SAGE GROUSE
(Exterminated)
Former Range
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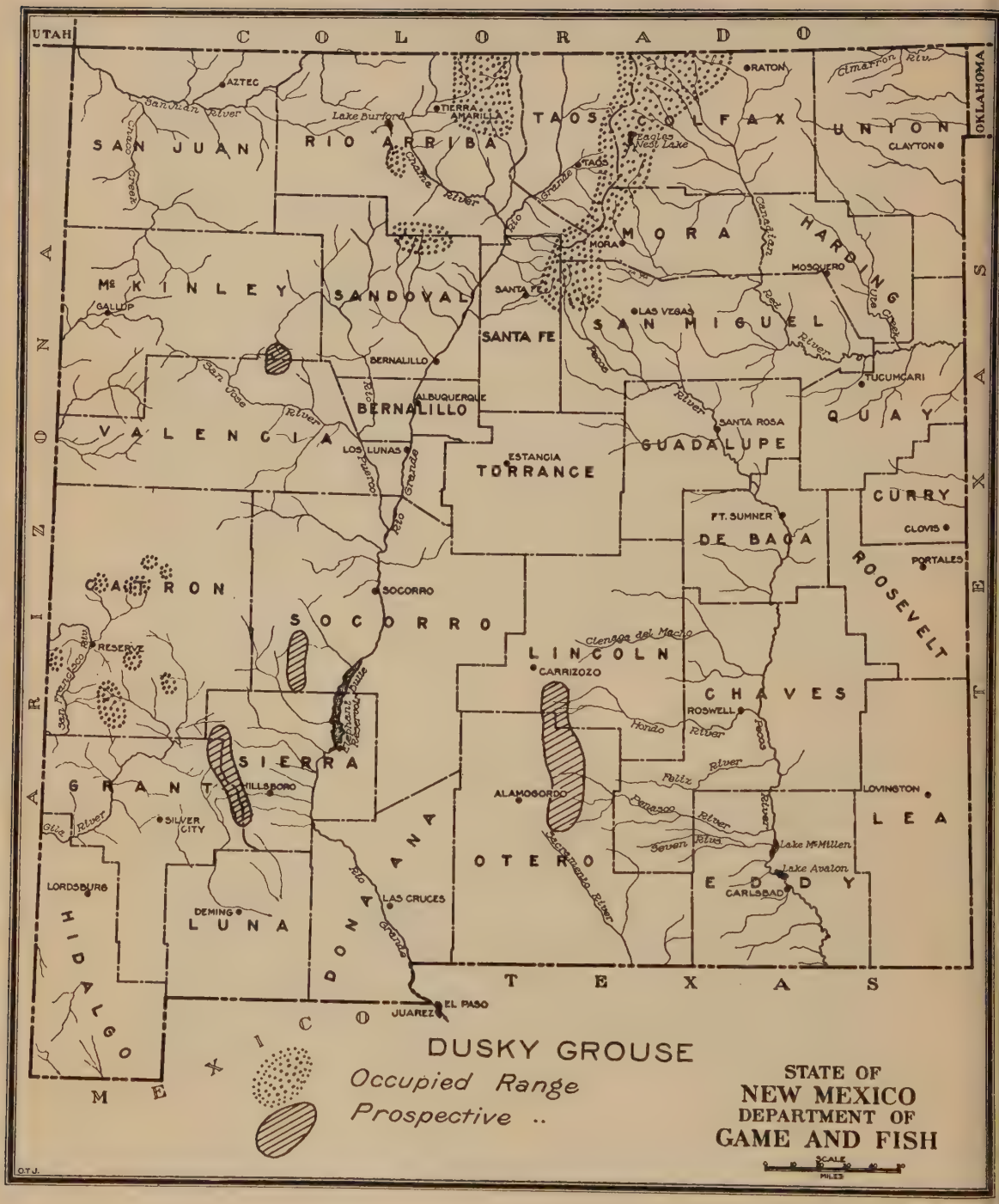
SAGE GROUSE

Upper: Pair of mounted birds in State Game Department collection
Lower: Type of sage country formerly inhabited by sage grouse in the state. Rio Arriba County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Rio Grande
DUSKY GROUSE
Occupied Range
Prospective ..
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES
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many years. According to reliable observers, it made its last stand in the vicinity of Tres Piedras, western Taos County, where conditions are most suited to its welfare.

It is not surprising that this large species, by virtue of type of country inhabited and ease with which the bird can be killed, was a victim of the encroachment of civilization on its limited range. In states to the north and northwest of New Mexico, where exist vast expanses of sage lands suitable to this grouse, and where the birds were formerly abundant over immense areas, their numbers were so seriously reduced by unrestrained shooting that strict law enforcement and refuges were necessary to prevent total extermination.

It is unfortunate that this handsome grouse was entirely exterminated in New Mexico. There are hundreds of thousands of acres of sage lands extending over San Juan, Rio Arriba and western Taos Counties, suited to no game bird so much as sage grouse. It seems highly desirable that these grouse be reinstated and given absolute protection until such time as they become well reestablished. The most promising localities in which to get them started are near Tres Piedras, and in the sage section northwest of Cuba. From these points of vantage the birds, if properly protected, should ultimately reinhabit practically all territory suited to them in the State.

DUSKY GROUSE (Dendragapus obscurus)

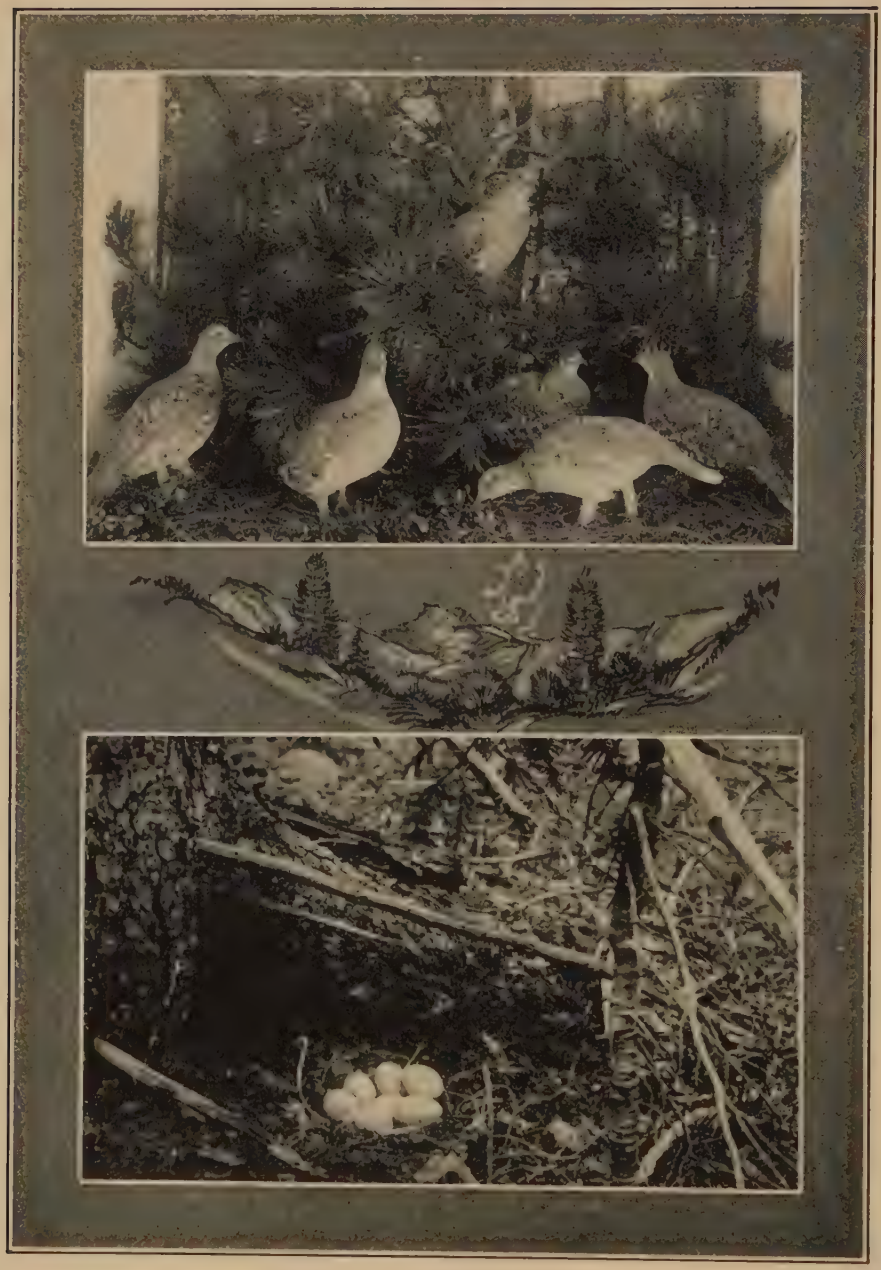
The dusky or blue grouse, as this species is commonly called, is one of the largest of the American grouse. This species, and related forms, are widely distributed throughout the mountainous sections of Western North America, from New Mexico and Arizona, to the border of the arctic regions.

The dusky grouse is a dweller of the coniferous forests in New Mexico. Much of its life is spent in fir and spruce trees, especially during the winter months, which often are long and severe even in its New Mexico habitat. The adult birds are not gregarious to the extent that are most of the grouse, but are usually observed in numbers, ranging from two to a half dozen individuals, probably the young with the mother bird.

DISTRIBUTION:

In New Mexico the dusky grouse occurs most commonly in the mountains of the northern section of the State. It is not found east of the Rio Grande, south of the Sangre de Cristo Range of Mountains, and only very locally about the summits of the highest ridges and peaks of some of the mountains west of the Rio Grande. This bird is rarely ever seen below 7,500 feet elevation, and ranges up to timberline.

Formerly it was far more common throughout its range than at present. In recent years it appears to occur in appreciable numbers only locally while over con-



DUSKY OR BLUE GROUSE

Upper: Group of mounted birds. Photo. by courtesy Colorado Museum of Natural History

Lower: Nest and eggs of dusky grouse

siderable stretches of its range the bird has remained very scarce. This shortage can no doubt be attributed to unfavorable breeding conditions, particularly scarcity of natural ground cover. Where the natural growth of weeds and grasses has been permitted to develop, the birds have best retained their numbers. Apparently, however, in only a few localities have the dusky grouse been entirely exterminated. Under favorable conditions, they should reestablish their numbers unaided by artificial means.

Conditions appear to be favorable for the dusky grouse in the higher parts of the Black Range, San Mateo, White and Sacramento Mountains. According to the oldest residents of the Black Range region, this grouse in former times was an inhabitant of these mountains but it has long been exterminated. There are no records of its ever having inhabited the San Mateo, White and Sacramento Mountains.

The dusky grouse is not as prolific as are most other members of this group of birds. Seven eggs seem to be the most common number of a clutch. In New Mexico it usually lays its eggs between May 10 and June 1. The male bird takes no part in the incubation of eggs or in raising the young, leaving these duties to the female. Fortunately, the young, as soon as they are able to fly—when they are smaller than quail—seek safety in the dense foliage of aspens and other trees when disturbed.

ENEMIES:

Like the wild turkey, the dusky grouse has many enemies among which man, except indirectly, is the least serious. The absence of weeds, grass and brush at breeding time increases immensely the dangers to which nesting birds and the young are exposed. So serious does this situation become at times that few or no young can be raised, accounting largely for the scarcity of grouse throughout most of this bird's range in the overgrazed mountains of New Mexico.

Skunks, wildcats and coyotes are the most serious enemies of the setting birds, their eggs and of the young. After the birds reach maturity, goshawks seem to be the most dangerous foes with which they have to contend; so skilled are they in locating and killing grouse that a single hawk of this species can seriously affect the supply over a considerable area.

Heavy rains, hail and snows also have a marked effect on the increase of their numbers, since the bird's habitat is confined to life zones in which the weather is often severe. There also appears to be an obscure enemy of this grouse, at times in the form of fatal internal parasites. It is improbable, however, that such enemies are of a very serious nature where the birds do not become abundant.

Since the birds are most common and sustain a stable supply consistently only where natural conditions favor them, the only hope of having good grouse hunting lies in the conservation of forest forage to the extent that it will supply the ground with liberal cover and in the control of their predatory enemies.

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LAKE MCMILLAN
LAKE ARTESIA
CARLSBAD
SACRAMENTO RIVER
LORDSBURG
DEMING
LAS CRUCES
RIO GRANDE
EL PASO
JUAREZ
PRAIRIE CHICKEN
Present Breeding Range
Suitable Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
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LESSER PRAIRIE HEN (Tympanuchus pallidicinctus)

The lesser prairie hen or prairie chicken is a local form of one of America's finest game birds. To distinguish it from its larger relative, which inhabits the north and east, the form to which the New Mexico bird belongs has been named the lesser prairie hen. Both the male and female have prominent neck-tufts and the males have conspicuous neck air sacs which they use in their spring mating calls.

Due to its size and the open country it occupies, the prairie hen has been badly persecuted. But so very hardy and prolific is it that it has managed to survive in limited numbers, even in New Mexico where suitable range is not very extensive. "Chicken hunting" has long been one of the most fascinating attractions to sportsmen of the prairie states. And now, with better enforcement of game laws and refuges, there is promise of this fine bird being perpetuated.

Agriculture, particularly where small grains are extensively grown, favors prairie chickens where the cultivated land adjoins prairies with rank grass in which the birds can live, nest and raise their young. In New Mexico favorable conditions are usually found along the eastern border where extensive areas of sandhill lands are available to the birds. But in the State the range of the prairie chicken is now so limited that should a short season be provided, discretion in hunting them must be used. In many sections of the country where conditions are suitable and where given benefit of protective laws, prairie chickens reestablish their numbers rapidly.

The nuptial performances of prairie chickens on their meeting or parading grounds during the mating period are among the most interesting and dramatic scenes in bird conduct. These meetings are of almost continuous occurrence at the height of the breeding season.

DISTRIBUTION:

Prairie chickens formerly inhabited all of the sandhill type of country in eastern New Mexico, from the Texas line on the south to the Colorado line on the north and west as far as where Buchanan is now located. At the present time the birds are confined to a comparatively small section, south and southwest of Portales. A few remain southwest of Clayton, and occasionally stragglers are observed in other sections of their former range. During the last few years there has been some increase and evidence of reoccupation of range.

It is not probable that prairie chickens would thrive outside of their former habitat in the State; but where given proper protection and range lands are not badly abused by overgrazing, they should reestablish themselves over their former range. Fortunately, enough of the birds remain to accomplish this rehabilitation without resorting to artificial means, if they are given proper protection.

ENEMIES:

Due to the fact that there are fewer predatory animals and bird destroying hawks in their usual habitat, prairie chickens have not as many natural enemies to

Photo by Courtesy American Museum of Natural History. From Habitat Group.

MATING CEREMONY OF PRAIRIE CHICKENS

Performances of the kind by prairie chickens are among the most interesting and dramatic scenes in bird conduct

contend with as have most other grouse. Man is the most serious enemy of this fine game bird.

Prairie chickens are locally migratory in quest of food. In the fall and winter they drift about, often leaving their more remote and therefore safest range, and by so doing subject themselves to illegal hunting. In order that they may have an opportunity to reestablish their numbers on all suitable range, they should be protected, no matter where observed out of the open hunting season. Settlements and farming districts now surround practically all prairie chicken range as well as the areas formerly occupied by them. Because of this, their increase and spread are wholly dependent on protection against law violators.

Coyotes are no doubt the most serious predatory enemy of the prairie chicken; but in recent years the numbers of this enemy have been successfully reduced in the open sections occupied by man, such as the prairie chicken generally frequents.

COLUMBIAN SHARP-TAILED OR PIN-TAILED GROUSE

(PEDIOECETES PHASIANELLUS COLUMBIANUS)

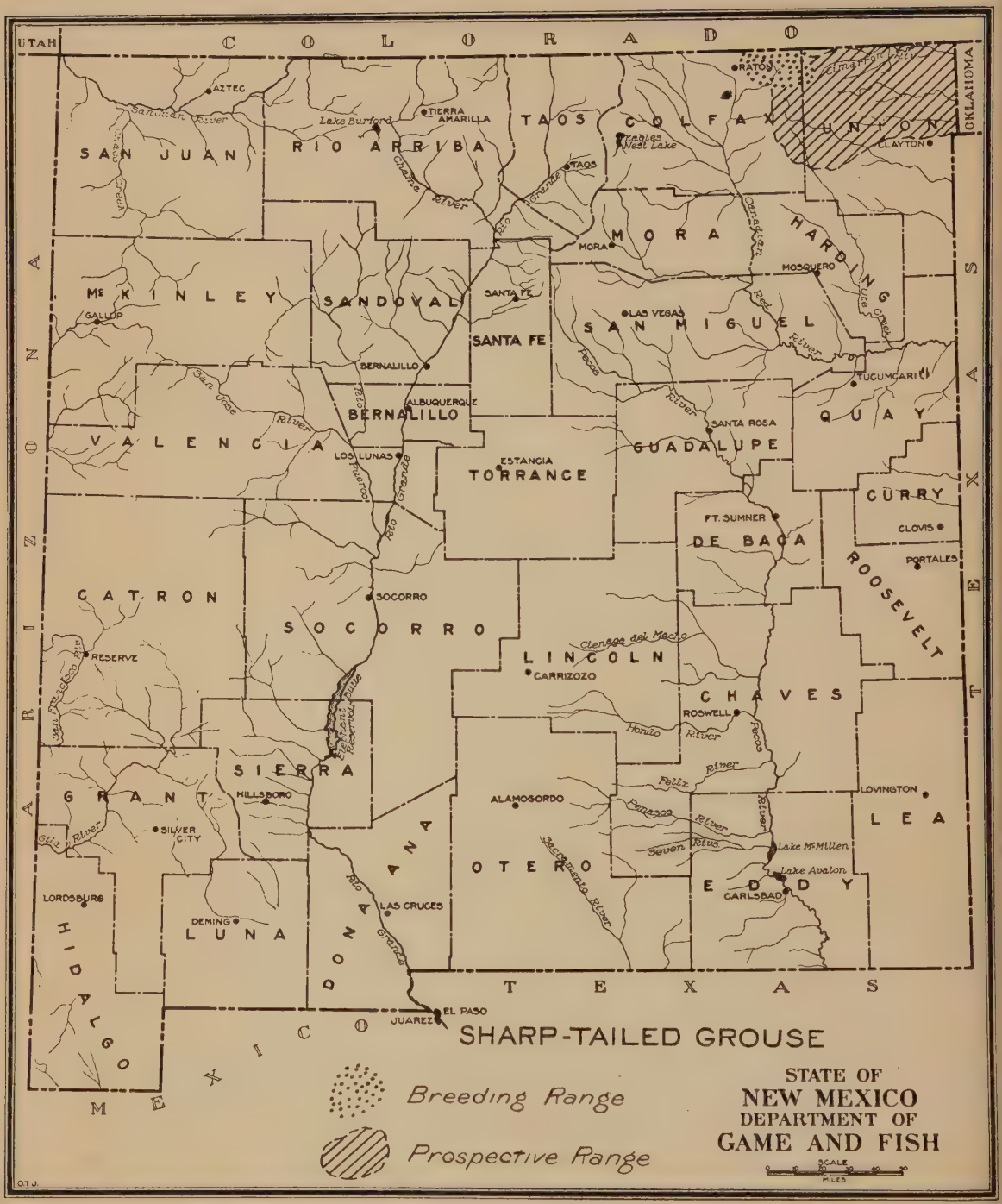
Although the pin-tailed grouse in size and general appearance resembles the prairie hen, it is a very distinct species. The prairie hen has a square or blunt tail while the pin-tailed grouse has a wedge-shaped tail ending in a narrow point, from which the bird derives its name. The bird lacks the neck tufts so conspicuous on the prairie hen, is slightly larger, paler in color and its legs are fully feathered. In markings the pin-tail is a beautiful species. It frequents similar open areas and possesses the excellent game bird qualities of the prairie hen.

DISTRIBUTION:

The range of the pin-tailed grouse in New Mexico is very limited, being confined to the high, grassy, broken-rimmed mesas, lying east and northeast of Raton. This bird is generally a dweller in more northern climes, but favorable conditions as result of altitude—8,000 to 9,000 feet elevation—on Johnson and Barillo Mesas appear to create a little world suitable to it in New Mexico.

It is not probable that pin-tailed grouse have ever occupied an extensive range in the State and there appears to be little hope of greatly expanding their distribution.

Oldest settlers advise that the birds have long inhabited their present range though in former times they were more numerous than they are today. These grouse, however, have survived remarkably, considering the fact that the mesas on which they dwell, as well as the adjacent valley lands, have long been settled. The fact that small grains, particularly wheat, are extensively grown on Johnson Mesa, the most important area occupied by the pin-tail, has greatly aided them, especially in the winter when the snow becomes deep and lies on the mesas for extended periods.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Hondo River
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Feliz River
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SILVER CITY
Gila River
ALAMOGORDO
Penasco River
Seven Rivs
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Lake Avalon
LOVINGTON
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DEMING
LAS CRUCES
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DONA ANA
HIDALGO
EL PASO
JUAREZ
SHARP-TAILED GROUSE
Breeding Range
Prospective Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
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ENEMIES:

As with the prairie hen, man is the most serious enemy of the pin-tailed grouse. Like the prairie hen, this grouse must have rank grass for dwelling and breeding places, but due to excessive grazing by domestic animals, the isolated patches of suitable cover to which it often is limited are now inadequate for its needs. Fortunately, however, about the draws and canyons that cut the mesa rims small oaks or shinnery furnish an excellent emergency cover.

Goshawks, wildcats and coyotes are serious enemies of the pin-tailed grouse in New Mexico since the borders of its mesa range are broken and timbered and furnish excellent cover for these predators. Better control of predatory species about the habitat of this grouse will greatly aid them.

WHITE-TAILED PTARMIGAN (Lagopus leucurus)

The ptarmigan is the rarest and most rarely seen of New Mexico game birds. For this reason it has been frequently regarded as mythical rather than as something real. It is a dweller in arctic climates and arctic forms of life are not generally associated with New Mexico's dominating sunshine. In this State, however, occur islets of the arctic zone, above the limit of trees, where dwell the ptarmigan.

The white-tailed ptarmigan is a dainty little grouse with fashionable tendencies —if a bird may thus be characterized—having its seasonal garbs. In winter its immaculate, white plumage renders it almost invisible on the bleak snow fields of its lofty home, which it never leaves. With the coming of summer, it is ready to simulate its surroundings in sedate style by taking on a mottled and gray plumage, so like its haunts in color as to create a remarkable camouflage. When I came upon two in white plumage on one of the Costilla Peaks, they remained unobserved on the snow, where they had been picking dwarf willow buds, until, with their characteristic little cackle they rose and flew a little way up the mountain side. On another occasion I came upon one in its summer plumage on Wheeler Peak, in late June. Not until it took wing did I see it, although it was nearby and I was carefully looking for ptarmigan at the time.

Unfortunately these ptarmigan are very unsuspicious and have been exterminated from some of the peaks in New Mexico, and nowhere are they as numerous as formerly. Their future existence in the State is threatened, and only by careful conservation measures can they be saved.

As a game bird, the ptarmigan is of little consequence to the sportsmen because of its extremely limited range which it refuses to modify. But to sportsmen, nature lovers and others it has an aesthetic value, because of the charm and lure it lends to the high spots of the Sangre de Cristo Range that nothing else can replace. It is not a question of increasing the bird's range but of maintaining the species in its natural haunts.

PTARMIGAN AND THEIR HABITAT

Upper: Ptarmigan in winter plumage. Photo. of mounted birds in State Game Department collection

Lower: As the ptarmigan's home appears in midsummer. Wheeler Peak

DISTRIBUTION:

Formerly the ptarmigan was resident on a dozen or more of the most lofty peaks and ridges of the Sangre de Cristo Range, which attain heights well above timberline. As a rule, snow is present on these elevations even through the warmest months of the year. All told, the ptarmigan's range in the State approximates perhaps less than 20 square miles and it is rarely, if ever, seen below timberline.

Ptarmigan have been exterminated on all of the peaks of the Pecos River drainage—Pecos Baldy and the three Truchas Peaks—and are on the verge of extermination on the Taos group of peaks—Old Mike, Wheeler Peak and Gold Hill. Fortunately, they have a better fighting chance on the Costilla and other peaks near the Colorado line.

There are probably less than 100 of these birds in the State at the present time. Apparently they are resident where found, leaving their accustomed little wilds only when forced to do so by congestion of numbers—a condition that has not affected them in New Mexico for many generations.

ENEMIES:

Excessive summer grazing of sheep and cattle over the treeless slopes inhabited by the ptarmigan has been the doom of many of these birds. If such overgrazing continues on all peaks, complete extermination of this species of grouse in the State will be the ultimate result.

The cropping down of the scant natural ground cover of grass, weeds and dwarf bushes seriously affects the food supply and breeding needs of the birds and leaves them exposed to their natural enemies, especially to the goshawks. With the grazing of sheep and cattle on these lofty ranges, a new enemy—the coyote—made its appearance. No doubt the activities of this predator have had much to do with the gradual disappearance of the ptarmigan. Red foxes also frequent the home of the ptarmigan and add their quota to the eliminating process.

When one considers the plight that has been brought upon the ptarmigan as result of occupation of its range by these new enemies, it is surprising that any of the birds remain.

Only by better conservation of the vegetation on these lofty slopes, control of predatory animals and protection against law violators is there any hope of saving the New Mexico ptarmigan.

QUAIL

In New Mexico, altitude and environment are the governing factors in the distribution and abundance of quail. The southern and eastern sections of the State constitute the principal quail territory, and so far as the sportsman is concerned, the scaled and Gambel are the two important species. While the Mearns

is rather widely distributed over the southern half of the State, it usually occupies somewhat inaccessible areas and is never so abundant as the others named. The bob-white is so very scarce that as a game bird it is of no consequence to hunters at the present time.

The scaled quail, being a desert loving species, is widely distributed in the State; but this species, like others of the quail family, outside of its zone of latitude and altitude, is sporadic in occurrence and cannot sustain its numbers under continued hunting because suitable range is too limited and climatic conditions are too severe. Quail winter-kill where snow becomes deep and lies on the ground for protracted periods.

Photo of mounted specimens in State Game Department Collection.

THE THREE DOMINANT SPECIES OF QUAIL OF NEW MEXICO

Left: Male Gambel quail. Center: Pair of scaled quail. Right: Male Mearns or fool quail

Unlike the grouse which can live and obtain food above snow or in trees, quail must get to the ground to feed and thus survive severe weather; hence they do not thrive at high altitudes or in northern latitudes. The Mearns quail, however, often successfully ranges up to 8,000 feet elevation or higher in summer and the Gambel to more than 6,000 feet, but such occurrences are in the southern section of the State and in warm canyons or on mountain sides with southern exposures. In winter they usually descend from their higher summer altitudes. Scaled quail are not found over extensive areas and in sufficient numbers to withstand general hunting above 5,000 feet elevation. The best scaled quail hunting in the State is from 3,000 to 4,500 feet elevation. Because of the extensive areas of country suitable to and occupied by this species, they furnish by far the greatest amount of hunting

of any quail in the State. The Gambel quail at times is in moderate numbers and sometimes becomes abundant, even more so than the scaled quail; but it has a disadvantage in that its range is limited almost entirely to the vicinity of watercourses.

Quail are the most available, dainty and sociable game birds found anywhere, yet these neighbors of man are subject to serious persecution. They require little range and pay well for any consideration given them by their attractiveness and as destroyers of injurious insects, consumers of weed seeds, and as a table delicacy.

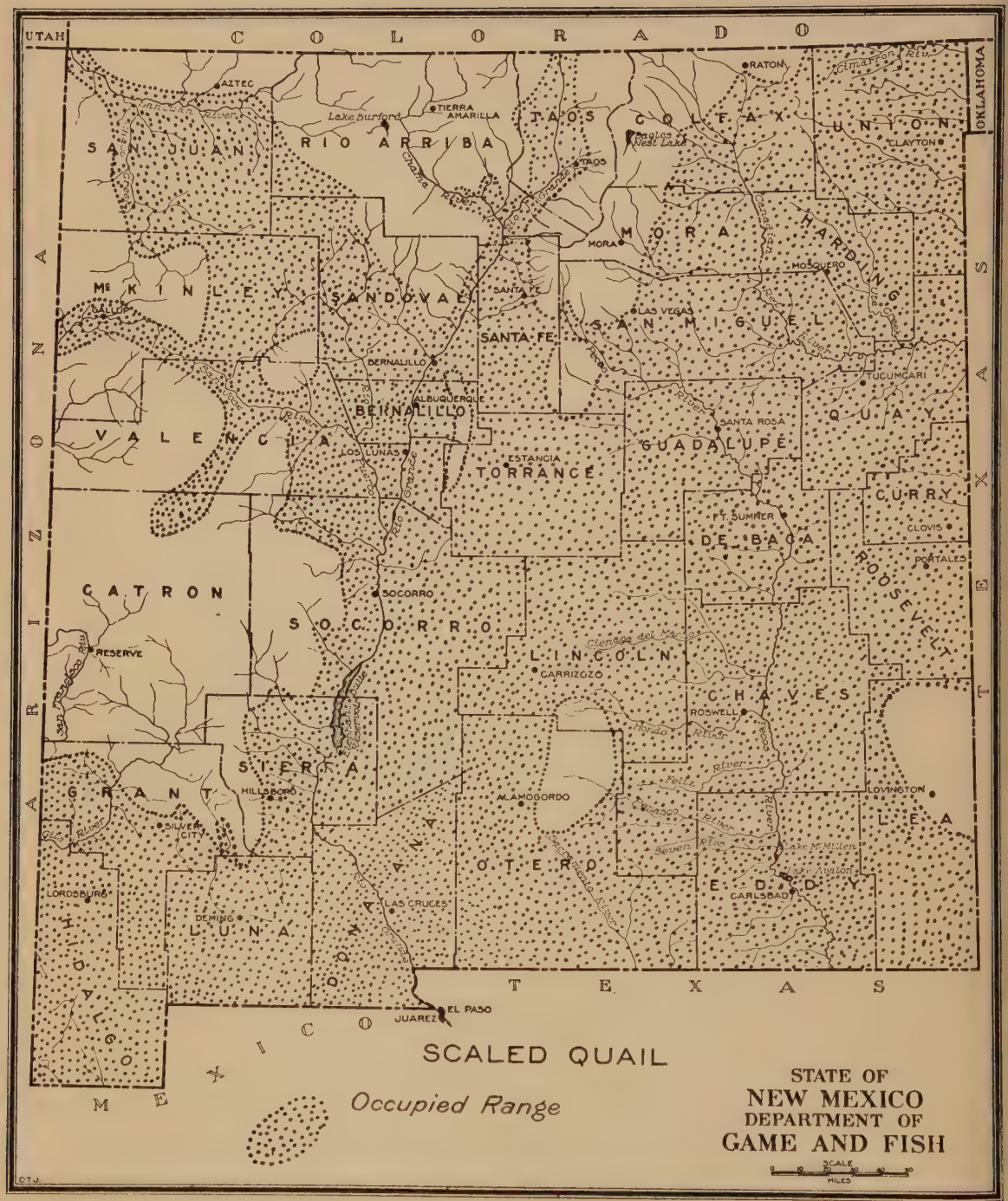
By nature all species of quail are intimately related to environment out of which it seems useless to try to establish them. In the transplantation of quail, therefore, topography and climate and vegetation must be carefully considered or failure will follow the undertaking. The southwestern quail love sunny climes and each species has its distinctive liking for particular kinds of brush and other plant life of its haunts. The presence or absence of trees does not materially affect them. The Gambel quail thrives best along watercourses, the bottoms of which are covered with brush, flanked by slopes and dry washes in which occur thorny brush, cacti, Apache plume and such plant life. Scaled quail are also dwellers of the thorny empire, but they shun the brushy watercourses, preferring the more open cactus, mesquite and cat-claw valleys, mesas and foothills. The Mearns quail is a canyon and mountain dweller. Among all of the New Mexico quail, both male and female take an active part in raising the brood. All of the species nest on the ground and, with the exception of the Gambel, roost on the ground.

Abundance and scarcity of quail run in cycles. Just what causes the variations cannot always be determined. It is generally conceded, however, that the years of plenty result from a combination of favorable conditions, such as sufficient ground cover, abundant food and favorable weather in the breeding seasons—seasons without cold rains or hail—at the time the birds are very young. Although these conditions all have a bearing on the supply, there appear to be other governing factors which have not as yet been determined.

In that portion of Western Texas, west of the Pecos, and throughout New Mexico, several times I have noted quail reduced almost to the point of extermination, and almost invariably this perilous situation would be followed by one or two productive seasons and the quail ranges would be restocked with amazing rapidity.

It is my opinion that these years of quail shortage are largely the result of destruction of natural ground cover by domestic animals, followed by drought, Not only do quail fail to raise young on barren ground because of lack of protection and scanty food supply, but their reserve ranks are rapidly reduced because they are then most exposed to enemies. Only in the naturally favored localities, where they have the benefit of brush and weeds of a permanent nature or in places remote enough from water so as not to be overgrazed, does a safe reserve supply manage to exist during such periods. During these years of poverty the impropriety of excessive quail hunting is so obvious that comment or warning against such hunting should be needless.

Close observation convinces me that drought within itself does not as a rule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SCALED QUAIL
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SCALE
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so seriously affect the quail supply so long as there is liberal ground cover in the form of grass and weeds. All of the quail rely on vegetation for both shelter and food, therefore, it is not difficult to understand when these two requisites are lacking why their numbers are often reduced. Destruction of the natural ground cover and not the hunter is the principal cause of the oft repeated quail shortage in New Mexico.

New Mexico has a liberal number of species of quail of as fine quality as those found anywhere. Sportsmen will do well therefore to confine their efforts to giving needed protection to native species rather than to import other varieties and thereby perhaps interfere with the welfare of the native birds which only need fair treatment to continue in abundance. It is natural to presume that native forms are best suited to local conditions.

The value of quail as food is too well known to require consideration here. For the average sportsman quail offer the surest and most accessible hunting of any of the resident land dwelling game birds.

SCALED QUAIL (Callipepla squamata)

The scaled quail, so named because the markings on its breast and neck feathers resemble the scales of fish, is a bird of the temperate arid southwest. In addition to being indigenous to Western Texas, practically all of New Mexico and Southeastern Arizona, its range extends well down on the tableland of Northern Mexico. This quail is known by various other names but is most commonly referred to throughout its range as the blue quail. A sub-species, the chestnut-bellied scaled quail, also occurs in Southwestern Texas.

The scaled quail, more than any other game bird, enlists our respect and admiration for its ability to endure severe climatic conditions. This species does not turn back where desert lands begin. It successfully endures the extremes of the climate on the dry, wind-swept expanses of cacti, mesquite and greasewood. Fortunately, water is not one of the essential requirements of these blue racers of the thorn-clad scrub lands, and they can exist with less cover than can other quail.

They rather shun reclaimed agricultural lands, preferring the nearby foothills and uplands, but there is hardly a rancher in the range of the bird who does not boast and highly prize a covey of "pet" scaled quail. Where not hunted, they become tame and make regular visits to the habitation of man, often being fed with the chickens. A flock of these dignified little bodies adds a distinct touch of interest to a ranch or desert homestead. Unlike other quail, the male and female are in practically the same uniform and can be distinguished only by an experienced observer.

During years of abundance, scaled quail often gather in large flocks of 50 or more; but, as a rule, the coveys number 12 to 25 birds.

DISTRIBUTION:

Scaled quail are distributed practically all over the State in treeless areas up to 6,500 feet elevation, and even higher in the south. The sections over which they occur most abundantly comprise the eastern one-third and southern part of the State. They are usually absent far out on the extensive open plains and prairies but at times, in summer, they venture well out there, where nothing more than grass, small weeds, wire fence lines and occasional ranch locations furnishes shelter for them.

During the culminating years of range devastation and drought—1923, 1924 and 1925—blue quail came near the extermination point throughout the State. During these trying years they disappeared entirely from some of their highest and most northerly range. With favorable range and breeding conditions of 1926, however, the birds reestablished their numbers in such a manner as to amaze sportsmen who feared the disappearance had been of a far more permanent and general nature than proved to be the case. Yet in some sections where the birds were formerly most abundant, for example, in the foothills of the Guadalupe Mountains in Eddy County, the disappearance was so absolute that little evidence of recuperation in numbers is shown. But no doubt another favorable season or two will permit complete restoration of former numbers where they are not too intensively hunted.

In contrast to the blanket distribution of the species in the eastern and southern sections of the State, the remainder of their distribution is spotted and on such areas the birds cannot stand up under intensive hunting, even during their best years. So far as this species is concerned, little, if anything, would be gained by transplanting, as all suitable range is now occupied or will become so by natural expansion under favorable conditions.

Scaled quail, like other members of the quail family, usually nest in May, however, local and seasonal conditions so influence their breeding that their exact nesting time is largely determined by existing local conditions. Nests containing eggs are sometimes found as late as September. Such an extreme occurrence is usually the result of a second or third laying in a season. While it is probable that a pair sometimes raises more than one brood in a season, second or third sets of eggs often are the result of earlier sets having been destroyed. Scaled quail are prolific and this largely accounts for their ability to reestablish their numbers so rapidly. Clutches of eggs are large, ranging from 9 to 18, the average clutch containing 12 to 14 eggs.

The range of the scaled quail's diet is so wide that when this little rustler fails to satisfy its appetite, conditions must be hard, indeed. In summer a vast variety of insects and green plant life constitutes its food while in winter its principal diet consists of seeds of weeds. During excessively dry periods, it often becomes a nuisance about ranches where it persistently eats young garden truck. Young alfalfa, lettuce and turnips are especially sought by the birds when their natural range has been drought stricken or made barren by overgrazing.

ENEMIES:

Absence of protective cover is the most fatal condition affecting scaled quail. Prairie falcons, Cooper hawks, roadrunners, snakes, skunks, wildcats and coyotes all take their toll of these birds or their eggs. Along the extreme northern limit of their range in the State, magpies are a serious enemy both as destroyers of eggs and the young birds. Fortunately, the plain coloration of the adult birds affords them more protection than is enjoyed by the more highly colored species of quail.

Hail, cold rains and winter storms seriously affect the scaled quail over much of their range, yet considerable of the bird's habitat embraces areas freest from visitation of these disturbances of the elements.

GAMBEL QUAIL (LOPHORTYX GAMBELII)

The Gambel, or valley quail as the species is often and appropriately called, is a proud and dignified bird of the brushy bottoms along hill-flanked watercourses. It is a very active, hardy species, amply able to take care of itself under natural conditions. Its boldness, when not hunted, noisy habits and attractive black-plumed helmet, make it the most interesting of the New Mexico quail.

Gambel quail seem most at home about small farms, such as those cultivated by the Spanish-Americans, which dot the narrow canyons and river valleys. The narrow, dusty, winding roadways through such valleys are favorite playgrounds of these active birds. Their odd cheerful call notes are commonly heard in their chosen habitat. Where the birds congregate in large flocks some lordly male makes it his business to perch in the top of a bush, like a sentinel while the others peacefully feed. When danger is imminent one quick alarm note is sufficient to send the entire flock scurrying to cover.

Like the scaled quail, the Gambel draws its food supply from many sources. In the growing season, vegetation, including small berries and fruits, and insects constitute the major part of the bird's diet. In winter fallen weed seeds and such suitable green weeds as are procurable, supply the bulk of its food. In the early spring it feeds persistently on the sprouting alfalfa, when available.

Due to the fact that the brushy cover selected by the Gambel quail is of a permanent nature, not seriously affected by drought nor domestic animals, and because irrigated fields are generally available to these birds, they do not fluctuate in numbers to the same extent as other quail which are more affected by local conditions, as drought and overgrazing. Since the supply is far more stable than that of other quail and as the type of range these birds generally occupy is not as extensively occupied by the other quail, it is a profitable undertaking to establish them in new range. The possibility of getting them established in many sections, outside of their natural range, is promising.

Owing to its close general resemblance to that species, the Gambel quail is often erroneously referred to as the "California" quail. While its range extends west

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GAMBEL'S QUAIL
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into the Valley of the Colorado River, it is a very distinct species from that bird and does not inhabit interior California, the home of the true California quail.

DISTRIBUTION:

The natural range of Gambel quail in New Mexico is confined to the Rio Grande Valley, as far north as Belen, and to the Mimbres, Gila and San Francisco River Valleys, and short stretches of tributaries of these four drainage systems. The birds, at least so far as our knowledge and records go, did not naturally range east of the Rio Grande Valley. They occur outside the four valleys named, in the southwestern section of the State—in the Silver City, Cloverdale and Rodeo sections,—but only locally and near living water. Unlike the scaled quail, these quail appear to always be dependent on water within a reasonable distance. Although they wander far afield in winter or during rainy seasons, they return to watercourses during dry periods.

In the Mimbres, Gila and San Francisco Valleys this quail ranges to higher altitudes, reaching 6,500 feet in mountain canyons, than it does in the Rio Grande Valley. With the creation of new conditions, incident to agricultural development, this bird, however, now often finds suitable environment in areas beyond its earlier range. The original range was governed both by water and the abundance of desert growing brush that furnished the necessary cover and protection. While watercourses in many localities appear well suited to this species, the birds are lacking, probably because such places are usually not sufficiently extensive, or widely separated from the original range.

That Gambel quail can be successfully transplanted and established in suitable valleys far from their original range has been proven in New Mexico. In the fall of 1909, forty-eight of these birds were shipped into the San Juan River Valley, in the extreme northwestern part of New Mexico, and released near Farmington. The birds are now well established there and are abundant on the San Juan and its tributaries. They have also been fairly well established in Colfax County and on the Rio Grande, west and northwest of Santa Fe.

The most promising section of the State unoccupied by the Gambel quail is the southeastern part, including the watercourses draining the Sacramento and Guadalupe Mountains and the lower Pecos Valley. The suitability of the Roswell section is doubtful, due to absence of the required brush and weeds. It is probable, however, that the tamarisk and other plant life which are becoming established along the wastelands of the Pecos River in this section, will in time furnish the necessary cover. The artificial establishment of thickets and hedges will, no doubt, here, as elsewhere, assist in creating suitable conditions for this attractive and valuable game bird.

While it is true that normally agricultural reclamation favors the Gambel quail, extensive and intensive reclamation, where all valley lands are cleanly cultivated, reacts against the birds and practically precludes them from extensive lands where formerly they were abundant. The Lower Rio Grande Valley, in New Mexico and

below El Paso in Texas, best exemplifies this point. While in these highly developed sections the birds may survive the crop growing seasons, although they have difficulty in hatching on account of their nests being broken up, in the winter when the fields are barren—with no permanent brush cover—existence in numbers is not possible.

The ideal cover for Gambel quail is thick mesquite, squaw or skunk brush and arrowwood. The birds sometimes roost on the ground where thick, extensive weed patches are available, but, as a rule, the adults prefer to roost in thick bushes, such as squaw brush, live oak, grapevines and other brush and trees with thick tangled tops.

Both because of type of cover in its selected range and its alertness and tree roosting habit, the Gambel quail evades its enemies the best of any of the quail. It is fortunate that the bird is thus favored since the greatest number of settlements, towns and roads, as well as small predatory night prowlers, are on the watercourses where cover is extensive.

Destruction of nests by snakes, rats, rock squirrels, skunks and other vermin is the most serious loss affecting these quail. Cooper hawks and goshawks prey on them as they do on all other species; but in their retreats Gambel quail evade hawks remarkably well. The birds usually collect in large flocks in winter, often as many as 75 ranging loosely together, but their alertness quickly warns them of impending danger.

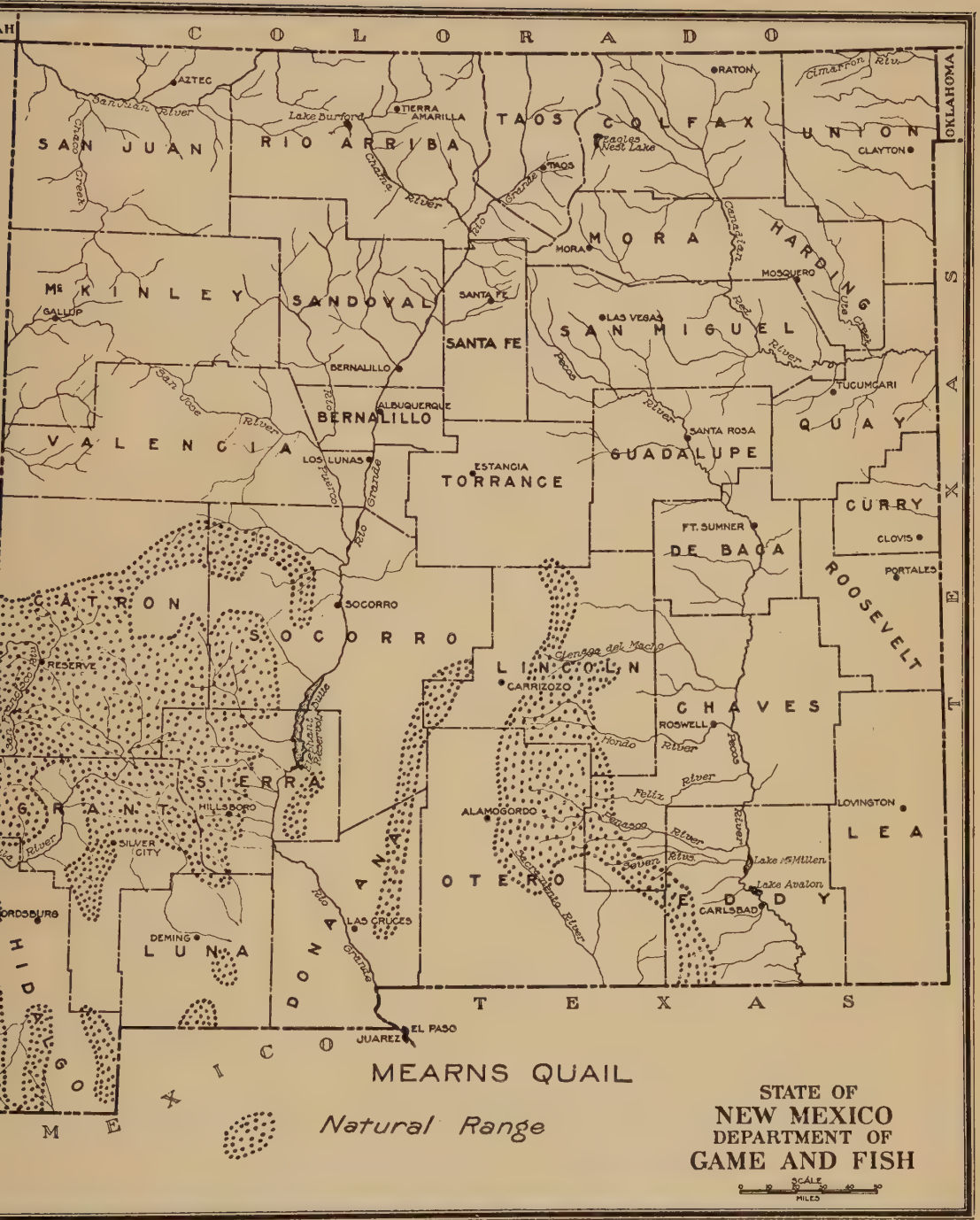
MEARNS QUAIL (Cyrtonyx montezumae mearnsi)

Mearns, or fool quail as they are generally known throughout their New Mexico range, possess old characteristics. They live in seclusion and are seldom observed except when they appear in unexpected, dashing flight. Under favorable living conditions, these birds formerly occurred commonly, often collecting in large flocks in fall and winter. They are very devoted to their chosen food—cocoanut or nut grass (Cyperus esculenta). The greater part of their time is spent in pursuit of the little tuber of this grass, which is of a very rich quality and not unlike the cocoanut in taste. These tubers are scratched from the ground by the long claws of the birds.

Because of their retiring habits, these are the least known of any of our quail, yet in plumage markings the males are the most beautiful of any quail inhabiting the United States. They lack the bold, dignified appearance so characteristic of the scaled and Gambel quail and rely on their stealth of movement, plain markings of their upper parts and good ground cover to protect them against their many enemies.

The females have no highly distinctive or conspicuous markings but the males have beautiful combinations of black, brown and white stripes about the head, and the undersides of the body are marked with white, blue, rusty and black.

Mearns quail contribute very little to the sportsmen's thrills. Even in their principal inhabited range, it is rare to find a sportsman who has killed them in any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ROSWELL
HILLSBORO
SILVER CITY
ALAMOGORDO
LOVINGTON
LAKE MILLEN
LAKE AVALON
CARLSBAD
DEMING
LAS CRUCES
EL PASO
JUAREZ
Lake Burford
Eagles Nest Lake
Canadian River
Pecos River
San Jose River
Rio Puerco
Rio Grande
Gallinas River
Penasco River
Felix River
Hondo River
Agua Negra River
Seven Rivers
Black Water River
Cimarron River
MEXICO
MEARNS QUAIL
Natural Range
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES

numbers. They withdraw from settlements and areas occupied by man because his occupation of their range interferes with the conditions favorable to them.

The nesting of the Mearns quail is almost unknown, even to the closest observers in the bird's habitat. The newly hatched young, however, are often seen where the birds are numerous. The broods usually consist of 10 or 12, and as a rule are hatched in June. Both parent birds are very attentive to their young.

In addition to the much sought nut grass, which is their staple food in fall, winter and spring, Mearns quail have a great variety of other food to draw from. Insects, small seeds, berries and fruits constitute a great part of their summer diet. Sumac berries, pinyon nuts and other nuts and small seeds are freely eaten and supply the bulk of their winter food where cocoanut grass is lacking. The flesh of the Mearns quail is the tenderest and sweetest of any of the quail.

DISTRIBUTION:

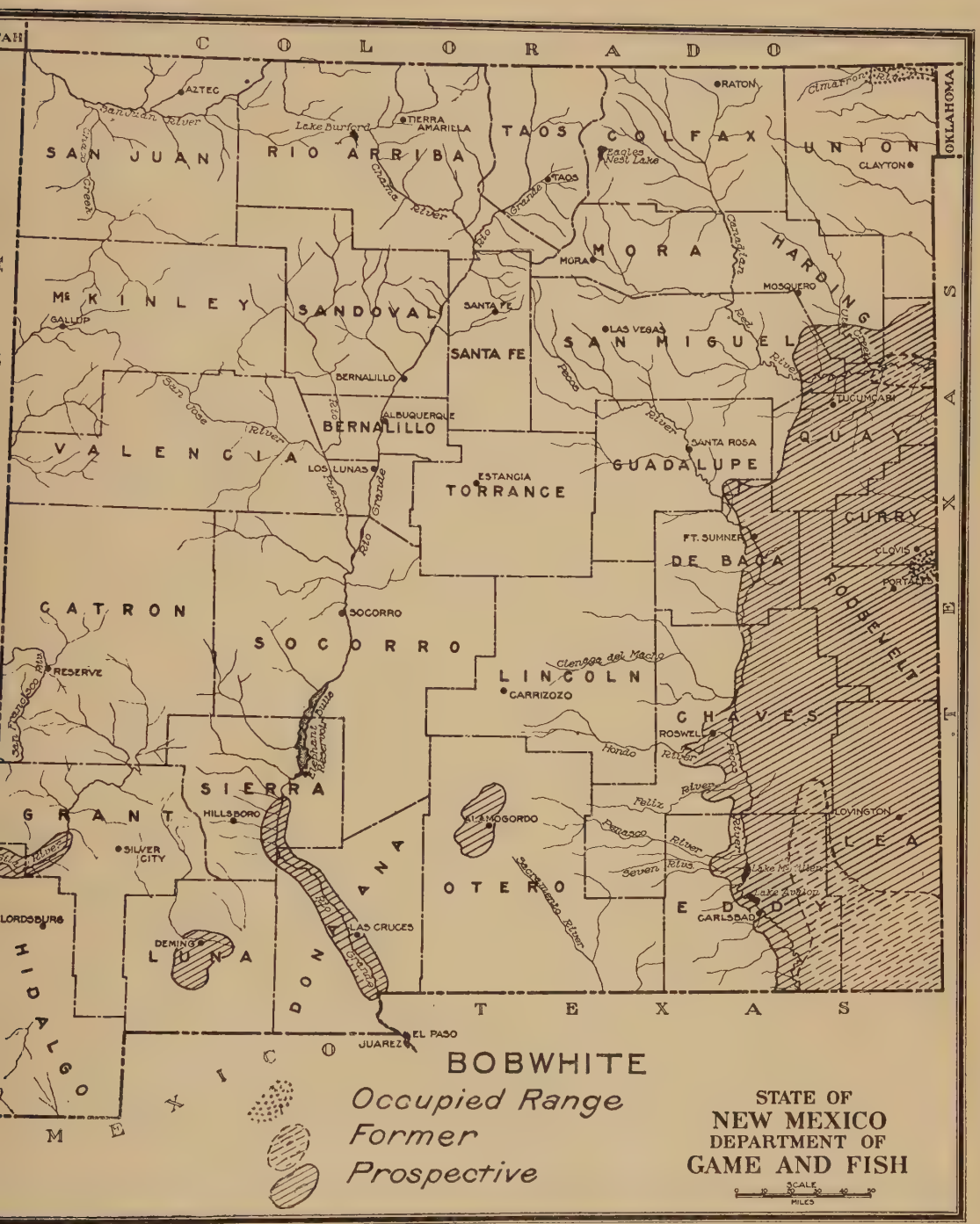
A line drawn east and west through Vaughn would throw the natural range of the Mearns quail in New Mexico to the southward. The birds, however, have been so reduced in numbers in recent years on account of the destruction of ground cover that they have been practically exterminated along the northern extremities of their range, and at present are nowhere as numerous as formerly. They are dwellers of the slopes of brushy, grass-grown canyons and mountain sides of the southwest,—Western Texas, southern portions of New Mexico and Arizona and south into Mexico being their range.

At the present time Mearns quail are most common in the Black Range, along the precipitous rims and canyons that encircle the San Augustine Plains, and in the desert mountain ranges of the extreme southwestern section of the State. They are not found east of the Pecos River in New Mexico.

ENEMIES:

The natural enemies of Mearns quail are determined almost entirely by conditions of the ground cover, grass in particular. The Cooper hawk is their most serious enemy. When the ground becomes denuded, a single Cooper hawk will sometimes hang around and so persistently catch the young quail, which can be spotted at their accustomed feeding places by the keen eyes of the hawk, that few of a covey remain. These birds, unlike other quail, flatten themselves on the ground where they chance to be when an enemy appears, relying on their protective coloration and inaction to escape.

Skunks, foxes and other small predatory animals are serious enemies of nesting quail. The birds also suffer at times in winter in the higher sections of their range on account of deep snow which prevents their getting to the ground. Often all birds at such altitudes die during severe winters. Hunting by man has never contributed much to the decrease of this species.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Lake Arthur
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Canadian River
Red River
Tucumcari Creek
Cimarron River
Gallinas Creek
Conchas Reservoir
Ute Reservoir
Clenega del Macho
Hondo River
Feliz River
Penasco River
Seven Rivers
Sacramento River
Salt River
Gila River
Mimbres River
San Francisco River
San Jose River
Rio Puerco
Rio Grande Conservancy Canal
BOBWHITE
Occupied Range
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STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES

BOB-WHITE QUAIL (Colinus virginianus texanus)

Reference to the range map will show the former distribution of the bob-white as having been limited to a comparatively small portion of the extreme eastern section of the State. This habitat conformed almost solely to the sandhill country up to a maximum of about 4,000 feet elevation. The birds evidently were most numerous in the extreme southeastern corner of the State and in the Canadian River Valley, near Logan.

Today there is hardly more than a trace of the native birds in this habitat. Their disappearance is wholly due to the destruction of ground cover,—weeds and grasses. I was able to learn of three birds having been seen in the sandhills east of Portales, near the Texas line, in April 1926, and a few have managed to exist along the lower Dry Cimarron in Union County.

Efforts have been made to introduce the bob-white in various localities but with little or no success. Some years ago bob-whites from Oklahoma were introduced in the vicinity of Roswell and while some have managed to survive from year to year, the venture did not prove to be very successful, probably owing to the absence of protective ground cover, especially in winter.

Much of the eastern and southern sections of the State is suited in altitude, topography and climate to the bob-white, but nowhere does favorable protective cover exist continuously. The birds prefer valley brush lands and, unfortunately, such areas are most exposed to grazing abuse. Efforts and expense incurred in trying to get these fine little game birds reestablished will be futile until such time as suitable living conditions are provided and maintained. If given cover on waste-land, they will no doubt thrive in the reclaimed valleys, but they cannot live on such bare ground as can the desert dwelling species.

To appreciate the type of country these birds must have in New Mexico, we need only recall the type of range they occupy farther east. They must have the cover afforded by brush, weeds and rank grasses not only in summer but permanently.

A wide interest in getting the bob-white established in New Mexico is manifest. This is fostered by former association with and love for this charming American game bird of those who have known it in its home in the east.

The native New Mexico bird is a sub-species of the bird of the east, known as the Texan bob-white. So far as the average citizen is concerned, it is identical with the familiar bird that calls "bob-white" in Virginia, Indiana, Alabama or Arkansas. The bird is too well known to warrant the recording of any life history facts in this report. In New Mexico, even under most favorable conditions and with best attention, it is not probable that these birds could thrive above 5,500 feet elevation.

LIFE SKETCHES OF MIGRATORY GAME BIRDS

PIGEONS AND DOVES

Three species of pigeons and doves occur in New Mexico of size sufficient to give them a value as game; these include the band-tailed pigeon, the white-winged dove and the common mourning dove. The little ground and Inca doves also occur rarely and irregularly in the extreme southern portion of the State, but their diminutive size precludes them from the game bird list.

Unlike many other game birds, pigeons and doves require water regularly, no doubt due to the fact that their diet consists largely of dry foods. They often make long flights from their breeding or feeding places to water; yet they fly with such ease and are so swift on the wing that such distances are of little consequence to them.

Doves furnish good hunting for those who do not have the time or physical ability to seek other game. Furthermore, this kind of hunting lessens the pursuit of other game birds and at the same time prevents the doves from becoming overabundant. Doves and pigeons are migratory and are protected under both State and Federal laws.

BAND-TAILED PIGEON (Columba fasciata)

The band-tail is the wild pigeon commonly seen in the mountains of New Mexico and is frequently confused with the passenger pigeon, a species that formerly occurred in immense throngs in the eastern states but which was exterminated many years ago. It never occurred in any of the Rocky Mountain States.

The band-tail, so named because of its distinct tail-band, is a beautiful bird in build and in coloration, being of nearly a uniform slaty blue color above, with a white nape band and iridescent color effects on the neck. It is slightly larger than the domestic pigeon, and in habits and flight resembles the tame bird. Locally this species is often known as "blue rocks".

DISTRIBUTION:

No other migratory birds are more sporadic in occurrence than the band-tailed pigeons. Their abundance or total absence from a district is governed almost wholly by the supply of mast. In 1925 there was a heavy pinyon mast and throughout central and southern New Mexico the pigeons were everywhere gorging on the nuts in the fall of the year. They were particularly abundant on the western slope of the San Mateo Mountains. Late one afternoon more than a thousand passed over my camp, headed for the higher elevations of the mountains, where they roosted. They were also abundant in the Black Range and other mountainous areas.

PIGEONS AND DOVES

Left: Pair of White-winged Doves. Center: Pair of Band-tailed Pigeons.
Right: Male Mourning Dove. (Photo. of mounted specimens in State Game Department collection)

In 1926 I was all over the State and observed probably less than a hundred pigeons. Most of these were in the extreme southwestern corner where they were at that time feeding on manzanita berries which were abundant there. During my observations over a period of years, I have seen the birds in all mountainous areas of the State; they often appear unexpectedly and leave as suddenly.

Occasionally the pigeons flock in and commit depredations on cherry orchards, as they have done in the Sacramento Mountains, at High Rolls and about the little villages along the western slope of the Sangre de Cristo Range; but, as a rule, they feed on the mast of the pinyon pine and oaks or on such fruits as elderberries, sumac and manzanita, and avoid villages and settlements.

Although there is no open season for the hunting of these birds, they do not appear to increase but remain in about the same numbers, an indication that they could not stand an open season in this State.

ENEMIES:

Personal observation leads me to the belief that band-tailed pigeons have few natural enemies. Their love for the timbered mountains together with their alertness and swiftness of wing has been their safeguard against extermination.

Natural conditions, especially the food supply, seem to govern their breeding and probably their numbers. Some seasons the birds drift about over the mountains with no apparent concern in nest building. If it is a fact, as it appears to be, that many of these pigeons pass some seasons without nesting, it is not surprising that these birds are no more abundant since, they usually lay one egg for a setting.

As a rule, these pigeons go south into Mexico for the winter. In a few instances I have known the birds to remain in the Black Range throughout the winter, being held there by the abundance of pinyon mast.

WHITE-WINGED DOVE (Melopelia leucoptera)

The white-winged dove is a migratory species and has some of the habits and appearance of both the pigeons and doves. It is slightly larger than our common mourning dove and is a very prolific species. Wherever common, it is extensively hunted as a game bird but it does not favor New Mexico with its presence in considerable numbers and therefore is of no great consequence to the sportsmen.

DISTRIBUTION:

The white-winged doves occur only in the extreme southwestern corner of the State—in the Gila River Valley as far up as Cliff and thence southward to the Mexican boundary. I have found them to be most abundant in the Cloverdale section of Hidalgo County, where they nest. These birds seem to confine their distribution in New Mexico largely to the stream courses and canyons along which grow the spreading Arizona sycamores.

ENEMIES:

The abundance of these birds in their most congenial haunts is evidence that they have few enemies, man no doubt being the worst.

MOURNING DOVE (Zenaidura macronra)

The mourning dove is the most abundant game bird sought by hunters of the State. Fortunately, drought appears to hold few terrors for this species other than necessitating longer flights to water. Its food consists entirely of seeds or small grain, especially wheat when fields of this grain are accessible. By far the greater portion of the bird's food consists of weed seeds, some species of which are produced even during the driest periods.

The speed at which the mourning dove travels and its skill in finding suitable food are factors in its favor. Although this bird lays but two eggs, nesting is prolonged throughout the spring and summer months in the latitude of New Mexico, and it is generally believed that it raises more than one brood a season.

Mourning doves have less regard for life zones and altitude than have any of the so-called game birds of the State. In 1926 they were more numerous than I had ever before observed them in the State. They were extremely common in the lower and intermediate elevations and were abundant up to above 8,000 feet. They easily and wisely adjust their distribution with the food supply.

DISTRIBUTION:

Mourning doves are absent from the greater part of New Mexico throughout the winter months but arrive early in spring and linger until late summer or fall. They winter regularly as far north as Hagerman, in the Pecos Valley, and Socorro in the Rio Grande Valley and elsewhere throughout the southern part of the State. With the return of spring, they spread all over the State except in the higher mountains.

ENEMIES:

Doves have fewer natural enemies than most of the widely distributed game birds. The bird-killing hawks, as the Cooper, the goshawk, and the prairie falcon prey on them sparingly, especially in winter when the doves are less active and congregate in flocks.

WATERFOWL

The two main watercourses of the State—the Rio Grande and the Pecos—flow from the north to the south and form natural routes of migration for ducks, geese, shore and marsh birds. Formerly such birds occurred in far greater numbers in New Mexico than now. Then many of them nested and raised their young in the

NESTING DUCKS MUST HAVE AMPLE WATER, FOOD PLANTS AND PROTECTED MEADOWS

Upper: Breeding ducks and grebes at Lake Burford

Lower: Lakes of the Pecos Valley of this type were formerly nesting sites for ducks, but were long ago spoiled by denuded shores

State; but drainage and destruction of stream and marsh plant life have greatly reduced the supply of food and cover, thus seriously reducing their numbers. Elimination of favorable breeding and feeding conditions has practically ended the breeding of ducks in some sections, particularly in the Pecos Valley, where they formerly nested in great numbers.

Ducks still nest locally in the State, particularly in the San Simon marshes and meadows in Hidalgo County; on the Rio Grande, in the vicinity of Socorro; at Lake Burford and at permanent lakes of high altitudes in McKinley, Colfax and in a few other counties. During rainy spring seasons, breeding birds are more widely distributed, nesting in the eastern and northeastern sections of the State, where occur many lakes that in the dry seasons contain no water.

Sportsmen of the United States have cause to be thankful that the vast waterfowl breeding grounds of North America, to our north, are situated on soil belonging to people of kindred spirits and who are providing for the welfare of waterfowl that are temporarily with them. For citizens of the United States to hesitate and wrangle over minor details of a vital conservation program rather than to provide resting, feeding and breeding places for the water, marsh and shore birds which spend much of their time on our soil and which we so freely kill is a reflection on our sincerity. The longer this duty of properly caring for the migratory wild fowl in the United States is neglected, the more difficult will become final solution. Furthermore, by delaying action we are not playing fair with our progressive northern neighbors.

Conservation of waterfowl is a problem and a study within itself, and cannot be properly treated in a report of this nature, but it is a subject that merits the most serious consideration. Waterfowl now occupy the most critical position of any wild life of the country. Unlike resident game of a state which is dependent only on local effort and sentiment for protection, migratory birds are in the possession of no one. In the words of the learned judges of the United States Supreme Court: "The whole foundation of the State's rights is the presence within their jurisdiction of the birds that yesterday had not arrived, tomorrow may be in another state and in a week a thousand miles away." Not only the State, but the nation and other nations are involved and the interests of all must be respected and protected in conjunction with other powers. In this case the State is an important stockholder with shares temporarily in trust which without consideration from other states and nations it might not have.

Sportsmen and progressive citizens of New Mexico have taken upon themselves the duty of protecting and conserving the resident wild life of the State; they now have another duty of equal or paramount importance—to better provide for the neglected and persecuted migratory waterfowl.

THE WADERS

New Mexico is not favored, during the breeding season, with a great variety of migratory game birds belonging to the waders, the long billed curlew, the mountain plover and the upland plover being the most important. These birds, although classed as waders, leave the water entirely at nesting time, breeding on the higher, open uplands. Birds of this group are protected by both State and Federal laws and at the present time, because of their scarcity, no open season is provided for their hunting.

These birds in New Mexico have been seriously reduced in numbers during the last twenty-five years. This depletion, however, has been almost wholly the result of hunting the birds outside of the State during migration. Especially has the upland or field plover been practically exterminated. Enforcement of the federal migratory bird law should in time favor both the curlews and plovers.

LONG-BILLED CURLEW (NUMENIUS LONGIROSTRIS)

Curlews are economically beneficial, feeding largely on insect life, one of their favorite foods being spiders which they have little trouble probing from the ground with their long, sickle-like bills.

Curlews are ground dwellers, and nest on the open prairies. Four eggs are laid and both the male and female assist with the raising of the young.

DISTRIBUTION:

The summer range of these curlews in New Mexico consists of the open sections of the eastern part of the State, east of the Sacramento and Sangre de Cristo Ranges. Out of the regions named, their occurrence is irregular. They breed from Roswell northward and west to Vaughn, Wagonmound and Springer, but most commonly east of Vaughn, south of Clayton and in the Ute Creek Valley, east of Roy. Condition of the range forage in the spring has much to do with their selection of breeding ground. If a former breeding range is dry, the birds are apt to shift to areas where vegetation is green to nest.

ENEMIES:

Curlews appear to have few natural enemies, except those of their eggs and young. The young run about for many days before they can fly, and are susceptible to the ravages of coyotes and other predatory species. The parent birds, however, are brave and skilled defenders of their nests and young and often effectively lure or drive enemies from their breeding grounds. Hail is perhaps the most destructive agency to which the eggs and young of curlews are subjected, since the birds nest during the period of the year when rain and hail storms are most prevalent.

LONG-BILLED CURLEW—SENTINEL OF THE PLAINS

Photo of mounted specimen in State Game Department Collection.

Courtesy U. S. Biological Survey, from drawing by L. A. Fuertes.

UPLAND PLOVER

One of the finest upland game birds of the plains, almost exterminated by wasteful hunters

UPLAND PLOVER (Bartramia longicauda)

The Bartramian sandpiper, better known in the southwest as plover, was formerly one of the most persistently hunted birds. Unrestricted shooting reduced these birds to the point of threatened extermination many years ago. Plovers used to move down over eastern New Mexico and western Texas in great numbers in the early fall, and at that period the birds became extremely fat. The size of the bird's body is about the same as that of a quail.

Plovers, as a rule, were shy when approached on foot but the frequency of passing vehicles and their ordinary harmlessness caused them to view them without fear. Formerly a hunter by using a horse and buggy could drive about over the prairies and kill dozens of them and the birds were thus shamefully slaughtered. Under continued absolute protection, it may be possible partly to restore these fine game birds to something like their former abundance, but the heavy grazing of the grassy plains they frequent will be a serious drawback to them. The beautiful call note of the upland plover, as it flies high in the evening or in the night, is one of the most charming bird notes of the plains.

DISTRIBUTION:

Formerly upland plovers were an abundant species throughout eastern New Mexico during the spring and fall migration. At that time they also bred in the State. During the last fifteen years they have become so scarce that it is unusual for one to see a half dozen of them during a breeding period.

In June, 1925, I observed a single bird, whose actions indicated that it was one of a breeding pair, near Logan in Quay County. In 1926 I was all over the plains and prairie sections of eastern New Mexico in spring, summer and fall, and did not see one. In May of the same year, however, I was informed by citizens of the Rosebud section that they had observed a few of the birds. In recent years I have seen no more than a dozen plovers in extreme Western Texas during migration.

True sportsmen, everywhere, should not only refrain from shooting plovers but should use their influence in preventing others from doing so. Under absolute protection they may be able to save themselves from the brink of extermination.

ENEMIES:

That man has been a serious enemy of the upland plover is attested by the present scarcity of the birds. Compared with man's destructiveness, other enemies, as coyotes, skunks, rain and hail storms are of little consequence.

MOUNTAIN PLOVER (Podasocys montana)

The mountain plover is one of the few upland game birds that favors New Mexico with its summer distribution and breeding range. This plover, however, is

unknown to the great majority of sportsmen in the State. Its name is somewhat misleading. Although its summer range is confined to elevated areas in the State, it is almost invariably found on the levelest and most open or treeless stretches of valleys, plains or mesas.

This plover is of a quiet, retiring nature and its coloration blends in with its gray surroundings to such an extent that it is difficult to see the bird unless it is moving. The birds may be seen singly, in pairs and in small flocks in the spring and summer; or in flocks in the fall migration.

Although mountain plovers are not now sufficiently abundant to permit hunting, it is possible that if protected for a few more years, they will increase sufficiently to provide some shooting. As game birds, however, they are inferior to the upland plover.

DISTRIBUTION:

The mountain plover is an elusive species and is rarely observed even in flight. It is, however, generally present on its chosen breeding grounds from early spring until late fall. It breeds sparingly but practically all over New Mexico. The plains section in the eastern part of the State and the San Augustine Plains, west of Magdalena, are two regular breeding areas. They also breed over limited areas in Torrance, Otero, Hidalgo, Santa Fe, Taos and other counties. In this State the mountain plovers nest in late April and early May, and like most of their kindred species, lay four eggs.

ENEMIES:

Just why the mountain plover does not occur in greater numbers than it does in the State is difficult to explain. It has never been subjected to intensive hunting, yet in all my travels throughout its New Mexico range, as well as northward in other states, I have never found it to be common. So far as I am aware, this bird has few natural enemies, the coyote and the prairie falcon probably being the most serious.

FUR BEARING ANIMALS

In dealing with the smaller fur-producing animals of predatory habits, the sportsmen must use discretion. Skunks, marten, mink, raccoons and foxes are all more or less enemies of game birds, yet the adventure derived from trapping or in running some of them with dogs and the value of their fur, render them of sufficient importance, especially to rural inhabitants, who seek their fur annually as a source of revenue, that any plans for campaigns against these vermin should take into consideration their economic value as well as their destructive propensities. Furthermore, as destroyers of injurious rodents and insects, they have an additional economic value.

Although coyotes and wildcats are fur-producers, fortunately for the sportsmen there is sufficient public sentiment arrayed against these depredators in the ranching and farming districts that the sportsmen's efforts and influence to control them only assist in promoting a good cause.

Beaver and muskrat are the only two fur-bearers that are non-predatory. These valuable fur-bearers can be conserved without detriment to the sportsmen's interests.

BEAVER

The beaver, in addition to being America's most industrious wild animal, is one of the most valuable fur-producers. Furthermore, through its activities in constructing dams for the impounding of water, it contributes to the sportsmen's needs by creating fishing waters, checking erosion, and often by creating ponds and even small lakes for ducks and other waterfowl.

Beaver are of ever-increasing interest to the public; as engineers and builders they command the respect and admiration of everyone. They contributed materially to the early wealth and conquest in the new world and were the cause of many bloody encounters between the adventurous trappers, themselves, and with the Indians. Their valuable winter coats are so prized that they are the cause of persistent law violation by trappers and "bootleggers" in furs.

From the viewpoint of man, beaver are not without their faults. Under certain conditions, they cut valuable timber, including fruit trees. In New Mexico it probably will be economically advantageous to remove the beaver from all main streams below 6,000 feet elevation. They are especially destructive on the Rio Grande. Obviously they cannot construct dams on the larger, wide flowing streams; hence they live in burrows under the banks, often tunneling far back from the water's edge. In time flood water eats away these honeycombed banks, taking valuable agricultural land with it. Along the main streams they also destroy big, attractive timber. As a rule, wherever beaver can construct and maintain dams in

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OKLAHOMA
TEXAS
ARIZONA
NEW MEXICO
SAN JUAN
RIO ARRIBA
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New Mexico they are far more beneficial than harmful. Their food consists entirely of herbs, bark and green twigs. Cottonwood, aspen, and willow supply their most dependable food.

DISTRIBUTION:

At the present time beaver are most numerous in the northern section of the State, but are found throughout the length of the Rio Grande in New Mexico and on the Gila and the Ruidoso in the White Mountains.

Beaver are still subject to illegal trapping which has prevented their increasing and reclaiming lost territory in the vast mountainous areas. The State Game Department should use every effort to protect beaver where their presence is desirable. The continued persecution of beaver as result of illegal trapping and traffic in their fur is a disgrace to the State. Violators should be penalized to the limit of the law, and if need be, more stringent provisions for protection should be provided. The U. S. Forest Service are doing what they can to re-instate and conserve them in the forests since by impounding water beaver create fire barriers and help hold back the runoff of surface water. They appreciate also the interest the presence of these industrious animals adds to the forests.

While beaver reestablish their numbers rapidly through natural migration, artificial planting will be necessary in many sections in order to accelerate their return. The reestablishment of beaver should be included in the transplanting program of the Game Department and the Forest Service; but such undertakings, in order to be successful, should be properly supervised.

Through the conservation of beaver, a splendid source of revenue to the State can be developed by trapping the surplus animals once they become sufficiently reestablished. The taking of beaver, however, should be done only by the State or if by individuals, then under the closest supervision. In the meadows of the high mountains, beaver are of most value because through their industry in constructing storage reservoirs and by maintaining series of dams and lakes, needed trout waters are provided, and their fur here attains finest quality. They should, however, be located on every mountain stream where food for them is available.

Beaver are perhaps freer from natural enemies than any other New Mexico animal of such high economic value. When man does not molest them, they have little to fear. Scarcity of water sometimes seriously interferes with their welfare but they usually meet this situation by moving to other localities.

THE MUSKRAT

Like beaver, muskrats are herbivorous and do not harm game or fish. Their food consists of aquatic plants, especially roots of cattail and rushes. They live in holes in banks and sometimes build conical houses somewhat like those of beaver, only much smaller. Due to lack of suitable extensive marshy places with necessary

food, muskrats are common only locally in New Mexico. By permitting them to increase and conserve their numbers in suitable marshes, lakes and streams, especially where waterfowl hunting and fishing are featured, another most valuable asset may be fostered among the aquatic resources of New Mexico.

In order to realize any appreciable value from muskrats, because of their small size, quantity production is necessary. They, however, are so very prolific and hardy that great numbers thrive in comparatively small areas where necessary food is available.

DISTRIBUTION:

Muskrats occur practically all over the State, even reaching altitudes of 8,000 feet in the mountain lakes. They are, however, most numerous in the Rio Grande and Pecos Valleys because in these valleys occur living conditions most suited to them. They should prove to be a valuable product of the drainage canals—deep canals dredged for draining the underground water of irrigated lands—in the lower Rio Grande Valley. They appear to thrive in these canals, and can do no damage. The rats, however, often commit damage by burrowing into irrigation canals, as has proved to be true in the Imperial Valley of California.

Should the drainage canals, of which there are hundreds of miles in the Rio Grande and Pecos Valleys, prove to be productive of muskrats, in order to propagate a breeding supply, it would probably be necessary for the State Game Department to designate suitable sections in the drainage canals where trapping would be prohibited, such places to be sanctuaries for the rats. It might probably also be found advisable to close the drainage canals entirely to muskrat trapping until the animals have had an opportunity to thoroughly establish themselves. At the present time muskrats occur in considerable numbers in some of the canals. Before their numbers are increased in such places a study should be made as to their relations to the maintenance of irrigation canal banks.

Since muskrats are water-dwelling animals, they can evade attack more easily than can the land-dwelling rodents. Bald eagles, coyotes and other predatory species, however, often catch them. They have tender flesh and in some sections of the country are considered a table delicacy, therefore, they have economic value both as a source of food and clothing.

OTHER FUR-BEARERS

While beaver and muskrat comprise the two non-predatory fur-bearers of the State, there are several other species which are not seriously predatory so far as game is concerned owing to their scarcity. Mink are not common in New Mexico, their habitat being the Rio Grande Valley as far south as Socorro and along watercourses in the Sangre de Cristo Range. That the mink is one of the most valuable fur producers of North America is too well known to require comment.

The marten is another valuable fur-bearer which is found sparingly in New Mexico. It is confined to the forests of the high altitudes of the Sangre de Cristo Range, from the head of the Pecos northward. Its scanty numbers prevent it from doing much damage to small game in this State.

The raccoon is a producer of valuable fur and is common along the principal watercourses—the San Francisco, Gila, Rio Grande, Pecos and Canadian Rivers—in the State. It does not usually occur above 7,500 feet elevation. Raccoons are omnivorous, and in habits are both aquatic and terrestrial therefore they are usually found about streams and lakes. They are fond of birds and chickens, but their principal depredation on game is no doubt through destruction of nests of quail, ducks and other birds.

The fox, especially the red and its color phases—cross, silver and black—is a producer of fine fur. The gray fox is the most common New Mexico fox and, fortunately, it is not a bad predatory form, as it feeds largely on mice, rats and berries and other fruits. Furthermore, it is an easy victim of trappers and is therefore rather kept under control.

The red fox is found only in a part of New Mexico, being confined to the Sangre de Cristo Range, from the head of the Pecos northward and the extreme northern mountainous country west of the Rio Grande. Red foxes are not sufficiently numerous over their limited range to constitute a very serious enemy of game.

Common skunks are among the most destructive small fur-bearing animals to all ground nesting birds, including ducks and shore birds, yet as destroyers of injurious rodents, beetles and insects, and as producers of fur, they have a high economic value. Skunks are widely distributed in New Mexico and are quite common in many sections. Fortunately, they are easily trapped and poisoned and their numbers are thus kept down. They also have a large number of enemies among the larger predatory animals.

The hog-nosed or "rooting" skunk is also of common occurrence in the southern part of the State.

The little spotted skunk, although one of the most serious enemies of nesting quail and other birds in many sections, owing to its scarcity can hardly be considered a serious enemy of small game in New Mexico.

FUR FARMING

Fur farming is developing into an important business all over the country, and although New Mexico offers possibilities in this line, little attention has been given it. Much of New Mexico's elevated country, where the winters are long and cold, is excellently suited to fur farming. The Sangre de Cristo Range—head of the Pecos, Red River and Moreno Valley, in particular—appears to be ideally suited to this business. The finest quality of fur that can be obtained in the southwest is taken west of the Rio Grande, north of the Chama River, particularly about Tres Piedras. Other sections, as the White and Sacramento Mountains, and Black and Mogollon Ranges offer less favorable opportunities for the establishment of fur farms.

There is a promising future in beaver and muskrat farming in some of the lake areas of the northern part of the State. In many localities series of small lakes, some of which were created by industry of the beaver, and where aspens and other food are abundant, are available. Cold water fishing would be benefited by beaver and muskrat farming.

In fur farming, the feeding of animals in captivity is an expensive proposition and often eats up all profits. In New Mexico where jack rabbits are so very abundant and very destructive to grazing and agricultural activities, it may prove practicable to utilize the rabbits as food for the fur-bearers and thus convert a liability into profit.

The growing scarcity of wild fur-bearers in time will give a greater impetus to the fur-farming industry and the opportunities New Mexico offers in this respect might well be utilized. The U. S. Biological Survey are in a position to give much valuable advice on fur farming and anyone contemplating going into this business would do well to first obtain information on the subject from this Bureau.

FISH AND FISHING WATERS

Only the physically able can indulge in the strenuous sport of hunting big game in its remote haunts. But fishing, the sport of the masses, can be enjoyed by every man, woman and child; even the afflicted can partake of its health-giving pleasures. The fact that New Mexico is rapidly becoming a world famous resort for health-seekers emphasizes the need for the highest development of this phase of recreation.

While it is true that New Mexico is an arid State, the northern area is favored by high mountain ranges that are the source of many cold water fishing streams. These streams are becoming increasingly popular both with citizens of the State and the traveling pleasure seeker. The southern two-thirds of the State has very limited cold water fishing, confined to the main drainage courses of the two highest mountain systems—the White and Mogollon—unless we consider the Elephant Butte Reservoir, with its water of low temperature, a source of cold water fishing. To offset any lack of cold water fishing, however, the southern section of the State has water for warm water species. Furthermore, this section offers possibilities for developing its warm water fishing through the stocking of drainage canals (not to be confused with irrigation canals) and Federally and privately constructed storage reservoirs.

COLD WATER FISH

It is interesting to note that without exception, the sources of all cold water trout streams of the State, of any importance, are in the highest mountainous areas and ranges, all above 10,000 feet elevation. With few exceptions, the highest mountain ranges are in the northern part of the State, hence the reason for there being fewer cold water fishing streams in the southern area.

The fact that trout streams have their source at high altitudes, however, does not mean that cold water fish are found only in high altitudes; but it does mean that good trout fishing occurs at intermediate altitudes only where the water from high altitudes has a swift current and sufficient volume to retain low temperature well down the slopes.

Formerly, before the normal flow of streams was seriously altered by man, good trout fishing occurred in the larger streams, as low as 6,000 feet elevation, in some instances 30 to 40 miles or even farther from their sources; but, today, with few exceptions no matter how high the source of the stream, one must go to an elevation of 7,000 to 7,500 feet to get worth while fishing.

The impairment of cold water fishing streams is almost wholly the result of devastation and abuse of watersheds caused by unrestricted grazing of domestic animals. This unwise utilization is the main cause of increased erosion and the sole cause of increased floods and consequent spasmodic flow of streams. The

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OKLAHOMA
TEXAS
ARIZONA
MEXICO
SAN JUAN
RIO ARRIBA
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UNION
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Mc KINLEY
SANDOVAL
SANTA FE
SAN MIGUEL
QUAY
VALENCIA
BERNALILLO
GUADALUPE
TORRANCE
CURRY
DE BACA
ROOSEVELT
CATRON
SOCORRO
LINCOLN
CHAVES
SIERRA
GRANT
OTERO
EDDY
LEA
LUNA
DONA ANA
HIDALGO
AZTEC
RATON
CLAYTON
TIERRA AMARILLA
Lake Burford
Eagles Nest Lake
TAOS
MORA
MOSQUERO
LAS VEGAS
SANTA FE
GALLUP
BERNALILLO
ALBUQUERQUE
TUCUMCARI
SANTA ROSA
LOS LUNAS
ESTANCIA
FT. SUMNER
CLOVIS
PORTALES
SOCORRO
RESERVE
CARRIZOZO
ROSWELL
HILLSBORO
SILVER CITY
ALAMOGORDO
LOVINGTON
Lake McMillen
Lake Avalon
CARLSBAD
LORDSBURG
DEMING
LAS CRUCES
EL PASO
JUAREZ
Rio Grande
Pecos River
Canadian River
Cimarron River
Gila River
San Francisco River
Ciengga del Macho
Feliz River
Penasco River
Seven Rivers
Sacramento River
PRINCIPAL COLD WATER FISHING AREAS
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
MILES
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farther north we go and the higher and more extensive the mountains become, the less impaired are cold water streams, because the higher and colder elevations are not so intensively grazed. In many sections of the country, especially in the Great Lakes States, unwise lumbering has had almost as serious an effect on stream fishing as has abuse of watersheds in the southwest.

The number of fish taken from the streams is no longer so serious a matter as formerly. The State is prepared to restock the streams, and as time passes restocking can be more and more economically accomplished. The planting of fish alone, however, will not result in good fishing. There is already evidence of overplanting of fish in some of the cold water streams of the State, while other streams and lakes because of their remoteness from a hatchery and difficult accessibility are in need of better restocking. Increased planting gives no assurance of increased fish of legal size unless waters are suitable and food is available for the increase. The Game Department is now working out and meeting some of these problems.

It is not difficult to understand just why cold water fish are not always numerous or prolific in the streams when one observes the roily water of canyon streams at flood stage, or the drift jams and up-rotted trees, as result of floods, during low water stage.

The first and most important step looking toward an improvement in New Mexico cold water fishing lies in the betterment of conditions for such fish—permitting the streams and watersheds again to clothe themselves for self-protection. In the bringing about of such conditions, the sportsmen must have the undivided support and cooperation of ranchmen and farmers. Without this cooperation their hands are tied so far as concerns improving one of the most dependable and thrilling outdoor recreations and sports—cold water fishing. On the National Forests improvement, fortunately, is more promising than elsewhere.

A large per cent of the New Mexico streams flow south, resulting in their more rapidly taking on a high temperature, and are thus unfavorable to the more desirable species of the cold waters. A stream that flows north, east or west is apt to be more sheltered from the sun and consequently is slower to lose its lower and more even temperature.

While in New Mexico cold water fishing is impaired and inadequate to meet the increasing demand, it differs little in this from other states after the fishing season has well advanced. Cold water fishing is a national pastime that taxes the streams to the limit of production, under most favorable conditions. Even in the "Land of the Ten Thousand Lakes", Northeastern Minnesota and in Northern Michigan, where there is almost as much water as land, one observes that there exist a keen rivalry and competition to catch the big wily fellows that others have missed. In the Great Lakes some of the finest fish have been almost exterminated. In that region we find fishermen fighting mosquitoes and tearing their way through willows and alders to get the benefit that the early season offers and later complaining about the stream being fished out. Is it any wonder then that in arid New Mexico we hear frequent complaint of poor fishing?

BEYOND THE HIGHWAYS

Upper: Trout stream feeder in the Sangre de Cristo Range
Lower: Willow Creek, a trout stream in the Mogollon Mountains

Upper: Source of the Santa Barbara River, a famous trout stream, and, (lower) trout from its icy waters

EAGLE NEST RESERVOIR, COLFAX COUNTY, NOTED FOR ITS EXCELLENT TROUT FISHING

LAKES THAT ABOUND IN COLD WATER FISH; RESULT OF THE INDUSTRY OF BEAVER. Carson National Forest

SUNSHINE AND SUCKERS—SHADOWS AND TROUT

Not so many years ago the Main, West and Middle forks of the Gila River were among the best trout waters in the State. Today fishermen who have long frequented these streams lament the disappearance of trout and wonder why these once fruitful streams furnish little or no fishing. For twenty miles up the Middle Gila, from its confluence with the East Fork, there is little or no trout fishing. Twelve years ago I had the finest trout fishing on this stream that I ever had in the State. These same twenty miles today produce little else than worthless suckers.

Since this situation is typical of many other main mountain streams of the State, reasons for the serious loss to fishing must be advanced before remedies can be applied. No doubt excessive fishing has contributed somewhat to the decrease in the supply of trout and this decrease in turn favored the suckers by removing an enemy of their young.

But the main reason for the disappearance is the change in water levels as result of floods and the disappearance of brush and other plant life that formerly sheltered the watersheds and the streams themselves. Where deep, cool, shaded waters used to prevail, shallow, sun-exposed shoals now exist. Because of rapid runoff of rain water and the increased wash from erosion, there has been a radical change in the stream flow. For many years periodic floods have been filling the canyons with gravel, causing the water to spread and scatter debris which obstructs the natural growth of plant life, so important as a food producer and as shelter for trout. The suckers have been favored both by the decrease and spread of the regular flow which check the speed and raise the temperature of the water.

Another fact that must be borne in mind is that the altitude of streams at the lowest point of descent under consideration is the lowest altitude at which trout thrive and any impairment either as to volume of water or temperature has a serious effect on these cold-water fish.

Any experienced trout fisherman knows that the place to get good fishing, except at extremely high altitudes, is where the temperature of water is low and the water is swift, tumbling and foaming into eddies, with the shade of overhanging vegetation. Such are trout waters; but when the volume is reduced and temperature increases under the direct rays of the sun, suckers come into their natural environment and soon dominate such waters.

What is true of some of the Upper Gila has been the history of many of the main upper waters of New Mexico streams that have a continuous extended flow, giving the worthless species an opportunity to ascend by progressive stages.

It is of significance to note that as far back as 1913, sportsmen were concerned about protecting the Middle Gila watershed. The Sportsmen Association of Southwestern New Mexico was founded September 24, 1913. An excerpt taken from the minutes of this initial meeting reads:

> "Upon motion the Executive Board were instructed to confer with Don P. Johnson (Forest Supervisor) regarding the destruction of willows on the Upper Gila."

SUNSHINE AND SUCKERS—SHADOWS AND TROUT

Upper: Middle Gila River where domestic animals have free access

Lower: A few hundred feet from where the upper view was made but where the watercourse has been partially protected from ravages of domestic animals

How are we to remedy the Middle Gila ailment? Can it be restored to its former condition? Whether or not it will be possible to restore it to its former condition remains to be proven; but we do know that it can be greatly improved through better protection of the watershed and the stream itself.

WARM WATER FISH

Under adequate provision, the large governmental and privately owned project reservoirs of the State insure permanent warm water fishing for the public. These are easily accessible and the liberal fishing regulations of the State Game Department put them in reach of everyone. These reservoirs are highly suitable for warm water fish, as bass and perch, if not for certain species of trout. Just what fish will thrive best in these waters and whether or not they will reproduce in a normal way, remains to be determined by fish specialists who have ample time for making experiments.

Because of their being heavily charged with silt and in some cases with alkaline minerals, coupled with periodic scanty flow, the main watercourses of New Mexico, as the Pecos, Rio Grande, Chama, Canadian and others, after the streams once reach the lower altitudes, are not suited to a variety of valuable fish. But the impounded waters from such streams in reservoirs are suitable for many valuable species. When waters are so impounded on such streams, as at the Elephant Butte Reservoir, the foreign matter settles to the bottom and the water becomes clear, making it excellent for fish. Because of their vast size, reclamation reservoirs, as the McMillen and Elephant Butte—the latter when filled having a surface area of 40,000 acres—when stocked, will supply fishing for a great number of people. For some distance below such reservoirs, provided there is a continuous flow of released water, the water is clear and is excellent for fish.

As already stated, opportunities are good for future expansion and development of warm water fishing in the State in connection with the inevitable development of irrigation projects. All such projects are not limited to warm water fish. The great Eagle Nest Reservoir in Colfax County and the Bluewater project now under construction in Valencia County, both at high altitudes, offer splendid opportunities for the further development of cold water fishing.

In addition, there are, all over New Mexico, lakes and private storage reservoirs of various sizes and at various elevations which can be utilized for producing fish. In time, all artificial bodies of water no doubt will be made highly productive of some species of fish. The more highly developed the warm water fishing becomes in the State, the lighter will be the tax on cold water fishing, thus making easier the upkeep of the latter.

WATERS FOR WARM WATER FISH

Upper: Elephant Butte Reservoir where vast warm water fishing possibilities are in course of development. (Photo. by E. L. Perry)

Lower: Typical drainage canal under the Elephant Butte Irrigation Project

DRAINAGE CANALS FOR FISH

For the further development of warm water fishing the drainage canals—deep, dredged canals that drain the excess underground water from agricultural lands—of the lower Rio Grande Valley in New Mexico seem to offer great possibilities. While the lower Pecos Valley also contains drainage canals, these, due to the mineral the seepage water carries, would probably not be well suited to fish.

Under the Elephant Butte project in the Mesilla Valley of New Mexico, alone, there are at present 225 miles of drainage canals that may be suitable for warm water fish. The flow in these canals, which is fairly constant throughout the year and relatively free from heavy silt, is from 6 second feet, in some of the weaker canals, to as much as 78 second feet in the stronger canals. Engineers advise that due to leeching of the soil, the quality of the water improves with time.

Should it be found that these canals are suited to bass or other fish, waste can be converted into productiveness, and since drainage is a necessary part of reclamation projects on the Rio Grande, drainage canal fishing might prove to be one of the principal sources of this favorite sport.

The drainage canals are unique in that they are self-protecting due to the deep and precipitous banks which shelter them from the devastating effects of domestic animals. Willows and other plant life are free to grow and overhang the clear, rippling water.

Determining the suitability of these drainage canals for fish, as well as ascertaining what species are best adapted to them, is also the business of fish specialists with ample time at their disposal.

Fish, for restocking purposes, being supplied through artificial means, fall in a different category from this point of view than land game. Any attempt at increasing the fish supply must take into consideration: first, the suitability of waters and, secondly, the species best suited to such waters, altitude being taken into account. The species best suited to waters at various altitudes should be determined by fish culturists. This phase of the work is already being carried out by the Game Department.

FISH HATCHERIES

Fish propagation in New Mexico, at the present time, is being hampered due to the lack of a sufficient number of fish hatcheries. New Mexico does not possess a Federal fish hatchery and has only three State hatcheries,—the major hatchery on the Upper Pecos, and two auxiliary hatcheries in the southern part of the State—all for the propagation of cold water fish. The two small hatcheries will probably meet the needs in the southern part of the State for some time to come; but in the northern area, where the majority of cold water fishing streams are situated, there is need for another cold water hatchery. This additional hatchery would relieve

the pressure on the Pecos Hatchery and would enable the State to meet more adequately the demands for fish for the northern area.

A warm water fish hatchery for stocking waters, particularly in the southern section of the State, is one of the most pressing needs. Until such a hatchery is provided, the warm water fishing needs cannot be met. The immense bodies of water constituting federal reclamation reservoirs will furnish the greater part of the warm water fishing. Since people not only from New Mexico but from other states as well have the benefit of fishing in such waters, a federally built and federally operated warm water hatchery should be provided.

LISBOA SPRINGS TROUT HATCHERY ON THE PECOS RIVER

GAME REFUGES AND SANCTUARIES

In order to insure a permanent reserve supply of game, a sufficient number of game refuges are absolutely necessary. By establishing refuges for wild life, we accord it the safest and most equitable means of protection without interfering with the pleasures of sports afield. That game refuges are now a necessity is an established fact and in the future their establishment and maintenance will be considered one of the most important factors in any progressive game conservation program. Too many refuges, however, must be avoided. Sufficient territory must be left open to the sportsmen to avoid the serious effect of congested hunting during the short open season on the available hunting range. Therefore in the creation of refuges in New Mexico this need for hunting territory has always been kept in mind.

The duties of the Game Department and sportsmen as respects refuges, however, do not cease with the designation of such areas. Sanctuaries for valuable wild life, unless prevented from becoming so, are also sanctuaries for predatory animals and smaller vermin. Even in the case of sanctuaries for game birds, as quail and waterfowl, precaution must be taken to keep skunks, coyotes, bobcats, rats and other vermin under control.

In New Mexico game refuges, as well as other game cover, need protection against the illegal killing of game by Indians. New Mexico has a big Indian population which is distributed over 2,097,601 acres of reservations. By nature the Indian is a master hunter and he feels that prior possession entitles him to enjoy former privileges on his hunting grounds today. Many Indians, through lack of knowledge or for other reasons, often entirely disregard refuge boundaries, and frequently kill deer with the principal object of getting the hides. The age of killing game in America for hides has long been passed. The kill of deer by Indians on and adjacent to their Reservations is an unknown quantity. This may be said of native Indians wherever they hunt. If the best interests of the public are to be served, restrictions must be thrown about this illegal hunting. The Game Department needs the cooperation of the United States Indian Service in protecting game.

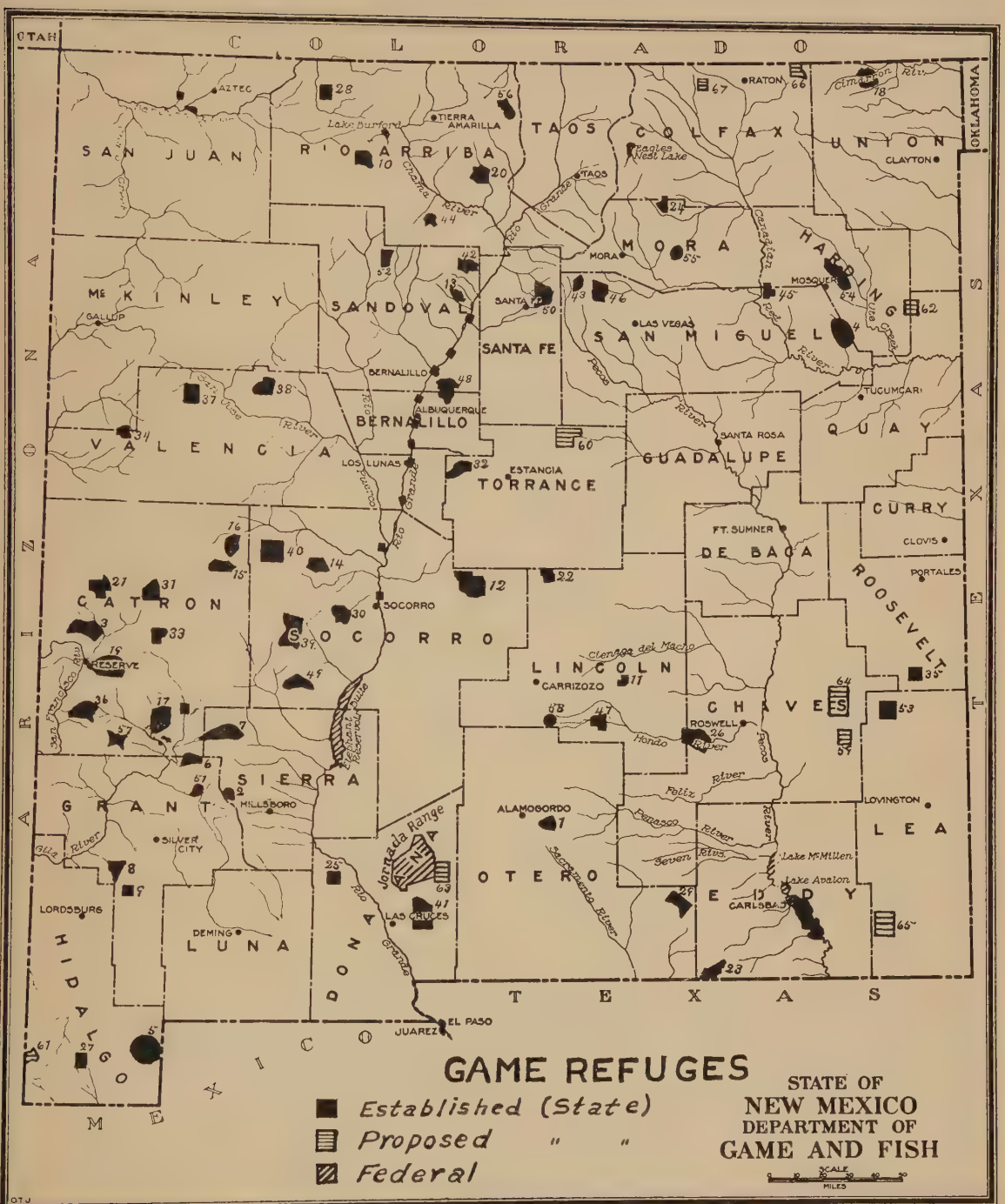
Fire is an enemy of all wild life, not only on refuges but in any properly conserved game cover. Policies governing the grazing of domestic animals on refuges and on other game territory should take into account the increased fire hazards that might result on many areas from completely eliminating the grazing of domestic animals. No doubt fire barriers will ultimately be provided in refuges from which domestic animals have been excluded, where fire dangers are most imminent. Such barriers would be effective except where heavy growth of timber occurs, and under such conditions grazing exerts little or no influence on the fire hazard. On open grass lands artificial barriers as highways, farms and extensive areas about the

habitation of man, which are used too extensively to permit vegetation to become sufficiently rank, minimize the fire menace.

In a country with such diversified topography and climate as prevail in New Mexico, local conditions govern to a great extent, the size and location of refuges. While the area of a big game refuge should be in keeping with the needs, these needs are by no means constant. At present in the southwest refuges may well be larger than in eastern states because of: (1) the abundance of game country, (2) the lower carrying capacity of much of the range and (3) fewer but larger refuges can be more adequately patrolled. Where refuges are strategically located in extensive game territory they may be larger than where there is only a limited, isolated game area. Where it is the desire to protect areas on each side of a mountain range, long and narrow refuges are practical. A long refuge saddling a range is more effective than are two with narrow divisional areas, as the latter are more difficult to post and patrol. In the northern area, because of the severe winters at the higher altitudes and on northern exposure of mountains, refuges with southern exposures and at intermediate altitudes best serve their purpose.

The fall and winter range of the game, food, water and climate should all be taken into consideration. A suitable area for the protection of turkeys, for example, should contain springs or living streams, and ridges, canyons and mountain slopes covered with pine, pinyon, juniper or oak. Of course in the case of some species, as antelope, prairie chicken and mountain sheep, limited in distribution and numbers, there is no alternative in selecting areas for refuges. Such species must be protected where they are found, regardless of whether the area has all the required qualifications for a refuge.

A glance at the game refuge map will convey an impression of the proportionate area taken up by all established and pending refuges in the State. The average size of the 58 established and 9 pending big game refuges is a little less than 28,000 acres. Big game refuges are named and numbered. State bird and Federal refuges are not numbered.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SOCORRO
CARRIZOZO
ROSWELL
LOVINGTON
SILVER CITY
HILLSBORO
ALAMOGORDO
LORDSBURG
DEMING
LAS CRUCES
CARLSBAD
JUAREZ
EL PASO
Eagles Nest Lake
Lake Burford
Lake McMillen
Lake Avalon
Jornada Range
Cienega del Macho
Rio Grande
Pecos River
Canadian River
Cimarron River
Gila River
Hondo River
Felix River
Penasco River
Seven Rivers
Sacramento River
San Francisco River
Mimbres River
Continental Divide
GAME REFUGES
Established (State)
Proposed " "
Federal
STATE OF
NEW MEXICO
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MILES

GAME REFUGES

BIG GAME REFUGES—STATE

NAME OF REFUGE	COUNTY	PRINCIPAL GAME PROTECTED	APPROX. AREA ACRES
1—Alamo Canyon	Otero	Deer, Turkey	15,230
2—Animas	Sierra	Deer, Turkey, Bear	9,600
3—Apache	Catron	Deer, Turkey	40,000
4—Atarque	San Miguel	Deer, Antelope	66,700
5—Big Hatchet	Hidalgo	Mt. Sheep	95,000
6—Black Canyon	Grant	Deer, Turkey	16,000
7—Black Range	Sierra	Deer, Bear, Turkey	34,000
8—Bullard Peak	Grant	Deer, Turkey	16,000
9—Burro Mountain	Grant	Deer, Turkey	9,600
10—Canada Ojitos	Rio Arriba	Deer, Turkey	23,680
11—Capitan	Lincoln	Deer, Bear, Turkey	5,120
12—Chupadera	Socorro	Deer	81,339
13—Cochiti	Sandoval	Deer, Turkey, Bear	16,320
14—Council Rock	Socorro	Deer	21,500
15—Crosby Mountain	Catron	Deer, Turkey	18,700
16—Datil	Catron	Deer, Turkey, Bear	23,200
17—Double Springs	Catron	Deer, Turkey	50,000
18—Dry Cimarron	Union	Deer	45,000
19—Eagle Peak	Catron	Deer, Turkey, Grouse, Bear	36,000
20—El Rito	Rio Arriba	Deer, Turkey	33,000
21—Fox Mountain	Catron	Deer, Turkey	23,200
22—Gallinas	Lincoln	Deer	12,800
23—Guadalupe	Eddy	Mt. Sheep, Deer	23,000
24—Halls Peak	Mora	Deer, Turkey	16,640
25—Hatch	Dona Ana	Deer	11,520
26—Hondo	Chaves	Quail, Antelope	46,400
27—Indian Creek	Hidalgo	Deer, Bear, Javelina	11,500
28—Laguna Seco	Rio Arriba	Deer, Turkey	26,000
29—Little Dog Canyon	Otero	Mt. Sheep	25,000
30—Magdalena	Socorro	Deer, Bear	24,800
31—Mangas	Catron	Deer, Turkey, Dusky Grouse	23,600
32—Manzano	Torrance	Deer, Turkey	34,714
33—Mayberry	Catron	Deer, Turkey	20,000
34—Miller	Valencia	Deer	11,929
35—Milnesand	Roosevelt	Prairie Chicken	10,240
36—Mogollon	Catron	Deer, Turkey, Bear, Grouse	38,000
37—Mt. Sedgwick	Valencia	Deer, Turkey, Bear	22,581
38—Mt. Taylor	Valencia	Deer, Turkey, Bear	20,285
39—Mt. Withington	Socorro	Deer, Turkey, Bear	33,000
40—North Lake	Socorro	Antelope	39,680
41—Organ Mountain	Dona Ana	Deer	51,200
42—Pajarito	Sandoval	Deer, Turkey, Bear	26,200
43—Pecos	San Miguel	Elk, Deer, Turkey, Grouse	16,860
44—Pedernal	Sandoval	Deer, Turkey	11,520
45—Poniente Canyon	San Miguel	Deer, Turkey	15,000
46—Porvenir	San Miguel	Deer, Turkey	35,000
47—Ruidoso	Lincoln	Deer, Turkey	21,120
48—Sandia	Bernalillo	Deer	60,422
49—San Mateo	Socorro	Deer, Turkey, Bear	21,800
50—Santa Fe	Santa Fe	Deer, Turkey, Bear	38,400
		Total area forwarded	1428,400

BIG GAME REFUGES—STATE—Continued.

NAME OF REFUGE	COUNTY	PRINCIPAL GAME PROTECTED	APPROX. AREA ACRES
		Carried forward	1428,400
51—Sapello	Grant	Deer, Turkey	9,000
52—Senorito	Sandoval	Deer, Turkey, Bear	22,400
53—Staked Plains	Lea	Antelope, Prairie Chicken	25,600
54—Tequesquite	Harding	Deer, Antelope	44,000
55—Turkey Mountain	Mora	Deer	30,000
56—Tusas Peak	Rio Arriba	Deer, Turkey, Dusky Grouse	20,000
57—White Creek	Catron	Deer, Turkey, Bear, Grouse	22,400
58—White Mountain	Lincoln	Deer, Turkey, Bear	5,100
		Total Area, Big Game Refuges	1606,900

BIG GAME REFUGES—STATE, PENDING

59—Caprock	Chaves	Deer	12,000
60—Deer Canyon	Torrance	Deer, Turkey	50,000
61—Peloncillo	Hidalgo	Javelina, Deer	6,720
62—Rosebud	Harding	Prairie Chicken, Antelope	40,000
63—San Andres	Dona Ana	Mountain Sheep	20,000
64—Sandhill	Chaves	Deer, Antelope, Prairie Chicken	40,000
65—San Simon	Lea	Deer, Javelina, Prairie Chicken	35,000
66—Trinchera	Colfax	Pin-tailed Grouse, Turkey	23,600
67—Vermejo Park	Colfax	Deer, Turkey	15,000
		Total Area, Big Game Refuges Pending	242,320

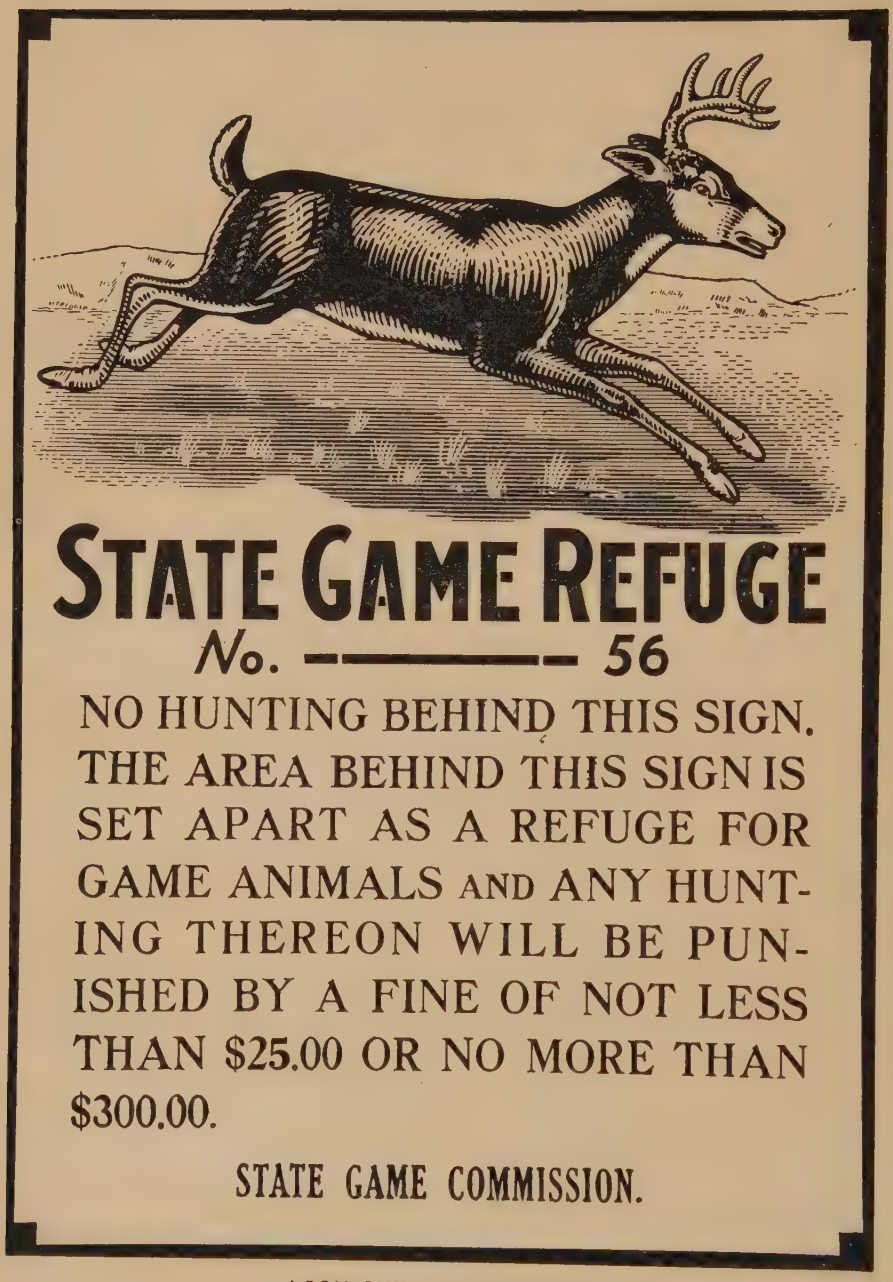
BIRD AND WATERFOWL REFUGES—STATE

Alameda Bridge	Bernalillo	Waterfowl Rest	256
Buffalo Valley	Eddy	Quail	2,400
Bernalillo Bridge	Sandoval	Waterfowl Rest	256
Barelas Bridge	Bernalillo	Waterfowl Rest	256
Belen Bridge	Socorro	Waterfowl Rest	256
Cienega	Santa Fe	Quail	3,200
Carlsbad Project	Eddy	Closed to Quail Only	64,000
Cochiti Bridge	Sandoval	Waterfowl Rest	256
Field Station	Quay	Quail	320
Isleta Bridge	Bernalillo	Waterfowl Rest	256
LaPlata	San Juan	Quail	3,200
Lake No. 20	Colfax	Waterfowl Rest	67
Lake No. 2	Colfax	Waterfowl Rest	300
Los Lunas Bridge	Valencia	Waterfowl Rest	256
La Joya	Socorro	Waterfowl Rest	1,280
Peninsula	San Juan	Quail	1,540
Picacho	Dona Ana	Waterfowl Rest	640
Salt Lake	Mora	Waterfowl Rest	300
San Felipe Bridge	Sandoval	Waterfowl Rest	256
Socorro Bridge	Socorro	Waterfowl Rest	256
V Cross T Lake	Catron	Waterfowl Rest	720
		Total Area	80,271

FEDERAL REFUGES

Jornada Range	Dona Ana	Antelope, Deer	192,000
Elephant Butte*	Sierra-Socorro	Waterfowl	40,080
Carlsbad Project*	Lake Avalon	Waterfowl	1,000
Carlsbad Project*	Lake McMillan	Waterfowl	11,500

* Reclamation Reservoirs.


STATE GAME REFUGE
No. ———— 56
NO HUNTING BEHIND THIS SIGN. THE AREA BEHIND THIS SIGN IS SET APART AS A REFUGE FOR GAME ANIMALS AND ANY HUNTING THEREON WILL BE PUNISHED BY A FINE OF NOT LESS THAN $25.00 OR NO MORE THAN $300.00.
STATE GAME COMMISSION.

LOOK OUT FOR THIS SIGN

Type of big game refuge poster adopted by the State Game Department (Black on yellow background)

In creating refuges, the number exclusively for antelope was purposely limited since antelope are continuously protected. Antelope, however, are afforded additional protection under the refuge system, since the carrying of firearms, without a permit, is prohibited on refuges.

Fortunately, a large number of the refuges are on the National Forests and thus have the benefit of Forest Service protection. Those that are not on the National Forests will be exposed more or less to violation until such time as an adequate patrol service can be inaugurated and maintained. As a rule, ranchmen everywhere assist in protecting refuges.

It is not anticipated that all of the refuges, especially the larger ones, will meet future demands. It must be remembered, however, that many of them were created under abnormal conditions; hence when range, abundance of species protected, and other conditions become normal, revisions may be necessary. Since there are now a liberal number of refuges created and in process of creation, any necessary revisions can easily be effected through eliminations or additions without changing either the location or the name of the refuge.

REFUGES ALREADY EFFECTIVE:

The value of game refuges in New Mexico is best exemplified by the effectiveness of the Double Spring refuge on the Gila drainage in Catron County. This refuge, comprising 50,000 acres, or approximately 78 square miles, was created in 1921. In the fall of 1926 a rather close survey of conditions indicated that there were no less than 2,000 deer on this area. Of this number about two-thirds apparently were mule deer and the balance white-tails. This refuge, for the most part, is excellent deer range, and even before it was designated as a refuge, its remoteness had somewhat precluded it from being as excessively hunted as is most deer territory. During the 1926 big game season the best deer hunting in the State was on territory adjacent to the Double Spring Refuge.

To determine hunting conditions throughout the State when all refuges become as productive as the Double Spring, the Black Canyon, the San Mateo and many others which already have begun to function properly, requires no stretch of the imagination. Better conservation of forage on the National Forests will be one of the most effective moves toward increasing game on such refuges.

MAINTENANCE OF REFUGES:

The secret of an adequate system of posting, patrolling and proctecting refuges is well defined boundaries, as canyons, streams, roads, trails and fences. The majority of people will respect refuges if they can locate boundaries. It is, therefore, imperative that the Game Department establish and conspicuously mark the boundaries so that they will be readily recognized. A conspicuous color combination should be used in refuge posting. The color combination adopted should be used

for no other purpose so that it would soon become associated with game refuges. The United States Forest Service assures me that should such a color combination be adopted, they would refrain from using the combination. The profile of a running deer or of another animal, bearing these colors, makes attractive boundary markers for big game refuges.

In addition to conspicuously posting all refuges, the State Game Department should make available district refuge maps with drainage and topography so shown that the exact location of refuges can be easily determined. The simplest means of designating big game refuges is by the use of numbers.

Big game refuges should remain sacred for the animals except where, under exceptional circumstances, restricted hunting may be permitted to reduce an unwieldy surplus, endangering the forage supply. If overabundance of animals demands relief, the size of the refuge might temporarily be reduced. But the refuges should normally be safeguarded for the big game and for the benefit of recreation seekers who obtain pleasure through sources other than hunting. To turn hunters indiscriminately into a refuge where the animals have become tame from protection would be to sanction slaughter and to defeat some of the highest purposes for which the refuge was established.

Refuges possess values greater than is generally understood. Doubt has been expressed by some observers as to the wisdom of persistently killing off the big, majestic bucks among deer. In careful and selective cattle and sheep breeding, the best and largest animals are retained for sires. In game hunting, the largest and finest breeding males are always the lure, often leaving small and under-developed individuals to supply the breeding needs. Does such a procedure tend to deteriorate the size and hardiness of the strain? I have observed runts among fawns. And who knows but that dominance of under-developed bucks has a bearing on the mortality among young deer? There has already been intimation in New Mexico that the mule deer in some sections, where long intensive hunting has caused a continuous scarcity of big bucks, are not as large as formerly. A well established system of refuges will in the future largely eliminate dangers that might otherwise arise from shortage of matured bucks.

In the case of antelope, it is generally assumed that the killing off of a certain number of the big bucks in congested areas might be advantageous, since the mature bucks frequently become injured while fighting among themselves, and apparently cause serious disturbances. Yet if too many were killed, the desirable breeders would be sacrificed. Fighting of bucks among deer, antelope and other species serves the good purpose of scattering animals and minimizing inbreeding—a thing the progressive ranchman carefully avoids among his domestic animals. For big game the need for permanent refuges where natural conditions may prevail is clearly evident, not only to insure a supply of game but also to maintain its size and vigor.

SMALL GAME SANCTUARIES:

There is much waste and semi-desert land in New Mexico. A great deal of such land is suited to game and especially to quail. To make it productive of such bird life, only protection from domestic and predatory animals is necessary.

Sportsmen living along the main watercourses, as the Gila, Mimbres, Rio Grande, Pecos, Canadian, San Juan and other streams could greatly improve and perpetuate their hunting by procuring chains of such sanctuaries. No doubt in cooperation with farmers much progress could be made in this respect.

With the more intensive utilization of agricultural and pasture lands, game animals and game birds, in particular, have been gradually eliminated. Lack of fences or the use of wire fences has resulted in the land being closely cultivated where corners and turnrows of considerable width might have prevailed. Field corners, thickets and wasteland must be conserved and dedicated to quail, and especially to bob-white and valley or Gambel species, if the birds are to thrive and furnish the sportsmen hunting. As destroyers of injurious insects and consumers of weed seeds, quail are worth many times over any other gains that might be realized from the little plots of protected ground they require. In the summer growing crops and other vegetation generally in evidence supply the necessary food and cover; but in the winter when such vegetation is lacking quail as well as other game birds, are in need of consideration from man to enable them to survive.

The establishment of pockets and small sanctuaries of from two to ten acres or more, well selected and liberally sprinkled throughout the valleys and along adjacent foothills, from which all domesticated and predatory animals are precluded, would solve the problem of protection for quail, pheasants, and rabbits. The planting of grain on portions of some of these areas, permitting it to remain solely for the benefit of such game, would greatly enhance the value of such refuges.

In some sections of the State—the Lower Pecos Valley for example—it will be necessary to grow hedges and thickets at suitable places for quail, pheasants and other game birds, so that they will have sufficient cover. In most sections, however, there is sufficient natural cover which needs only protection to serve the purpose.

Mulberry and Osage orange make excellent hedges while plum, locust and Russian olive provide thicket cover for corners and waste places. In the Pecos Valley and other more arid sections tamarisk or salt cedar is flourishing and no doubt will serve as emergency cover for game birds. Where sunflowers and other weeds are permitted to grow and stand in uncultivated areas, they serve both as excellent cover and food for game birds.

The selection and acquisition of refuges for the above mentioned purposes will require time and the utmost care; but their establishment throughout the State must be included in the game conservation program. The cooperation of game protective associations and civic organizations is needed to carry out successfully this part of the program; however, such areas eventually should belong to the State and have the prestige of State supervision in their protection and maintenance.

One of the serious problems that the future may hold in connection with game refuges deals with the sportsmen's privilege of hunting the overflow or surplus game about refuges which are surrounded by privately owned lands, owners of which frequently insist on precluding the public from hunting. The refuges in the National Forests being surrounded, in most cases, by Government land, do not offer this problem for solution.

This is a matter that merits careful consideration; for if the State provides quail and other refuges, there must be assurance that land owners surrounding such areas will permit the public to hunt the overflow on their land. In strictly open range country, the privilege of hunting overflow game may not be questioned, but with the creation of refuges in the agricultural areas, consideration must be given lands adjacent to refuges or trouble may later manifest itself.

Perhaps the best safeguard against refuges being blocked by privately owned lands surrounding them, in some cases, will be the procuring of sufficient area to permit of an inner sanctuary and outer hunting zone. Size of refuge when created, should take into consideration such needs.

At the present time a few refuges located on privately owned lands are beyond the reach of the general public because the lands surrounding them are privately owned and hunting on such lands is subject to the will of the owner. While such refuges are too new to throw off an overflow for hunting, the time is not far distant when they will begin to do so. Somebody, to be sure, will get the benefit of the increase and of the overflow of game; but whether it will be the public, time alone will disclose.

If farmers are brought to the realization of the economic value of game birds as destroyers of injurious insects and consumers of weed seeds, they should be willing to grant the sportsmen hunting privileges in return for their having supplied refuges and stocked them and adjacent areas with quail and other birds and for having assisted in killing out vermin on such areas. Such pleasant relations among sportsmen, farmers and ranchers may be but an idle dream; but if they could be cultivated and established in the future, no warnings of the above nature would be necessary.

WATERFOWL SANCTUARIES:

Chains of well selected and well protected areas, ultimately to come under the jurisdiction of the State or Federal Government, also are necessary for migratory waterfowl. Any delay in acquisition of such refuges will permit the precarious waterfowl situation to drift further from a solution. The need for these, while suitable places are available, is even more pressing than for game bird refuges. In many localities the two refuges can be created in one.

In New Mexico, the matter of suitable waterfowl food warrants the most careful consideration. Aquatic food plants best suited to the varied waters should be determined and introduced. In many sections the protecting of native plant life so that it may develop and seed will no doubt insure a food supply.

It is probable, even though legislative or congressional action be necessary, that State and Federal lands, suitably situated, can by transfer or exchange be acquired for permanent waterfowl refuges and public shooting grounds. Furthermore, sportsmen and citizens of means could erect no better or more lasting monument to themselves than to acquire suitable areas for quail, ducks or other wild life and under their own names dedicate them to the State or Federal Government as sanctuaries for all time to come.

DESIRABLE AREAS FOR WATERFOWL SANCTUARIES:

There are throughout the State many suitable places for water, marsh and shore bird feeding, breeding and public shooting grounds. The following are the most desirable of such areas in the State:

Rio Arriba County:—The wonderful Lake Burford (formerly Stinking Lake) one of the greatest wild fowl resorts of the Southwest. (This lake is on an Indian Reservation.)

Mora County:— Marshes and spring fed lakes, near Wagon Mound.

Hidalgo County:— San Simon marsh lands, north of Rodeo.

Lincoln County:— Lakes in the Tularosa Valley, particularly those fed by the Malpais Springs.

The Rio Grande Valley—Bernalillo, Valencia, Socorro, Sierra and Dona Ana Counties—contains many suitable sites for waterfowl sanctuaries and breeding grounds.

The Pecos Valley—Chaves and Eddy Counties, in particular— contains some very well suited lakes and marsh lands for wild fowl refuges and breeding grounds. The mouth of Salt Creek, north of Roswell, lakes east of Dexter and near Lake Arthur, marshes and lakes on Seven Rivers, and Willow Lake near Malaga, all should be secured and perpetuated for the benefit of waterfowl.

Sportsmen's Associations, the State Game Department and the Federal Government should endeavor to procure and fence the best of the areas referred to before they are further impaired by drainage or otherwise.

A HOME FOR THE PERSECUTED PRONG-HORN ANTELOPE:

There is an urgent need for an antelope sanctuary in New Mexico, preferably owned and administered by the Federal Government. Montana has its Glacier Park with rare wild animals, Wyoming its Yellowstone, Dakota its Bison Range, Oklahoma its Wichita Preserve; but New Mexico and other southwestern states have nothing of the kind. Nowhere is there an exclusive home for the persecuted prong-horn antelope. The strides New Mexico is making in game protection entitles her to this consideration. There are areas in southeastern New Mexico, on the Staked Plains, that possess all the requirements of an ideal antelope sanctuary. The status of the antelope demands that at least one area be set aside in a temperate climate where the animals may be perpetuated and on display for the interested pub-

lic. Furthermore, the great amount of territory from which these interesting creatures have been exterminated demands that a source of supply be established from which re-stocking operations may be carried on.

A national antelope sanctuary, easily accessible, in southeastern New Mexico, would in time prove to be one of the greatest attractions on the Transcontinental Highway system of the southwest. Suitable areas have been inspected that will never have real agricultural value and one of these should be procured without delay and set aside as a permanent antelope sanctuary.

THE MOGOLLON WILDERNESS PROPOSED:

From the standpoint of beauty, climate, topography and seclusion there probably is no area in all North America so exclusively suited for a year-around quiet retreat for game and man as the Gila River drainage of southwestern New Mexico. This area comprises approximately 1,700 square miles or 1,088,000 acres, and is practically all in National Forests. The elevation ranges from less than 6,000 feet to more than 11,000 feet. This drainage is well watered and contains some of the most inaccessible mountains and most magnificent mountain and canyon scenery to be found in the United States. The area is used almost exclusively for grazing, containing practically no agricultural land.

Some years ago hunters from distant cities who had more wealth than adventurous red-blood and endurance threatened to use their influence in getting an automobile road into this last outpost of wilderness. Then and there I resolved to use what influence I had with the Forest Service and friends of conservation to hold at bay the conquering engineers; and combined forces have resulted in partly carrying through this plan of restraint. The perpetuation of this piece of wilderness has long been one of the conservation battle cries of Aldo Leopold of the Forest Service. But the time has come to dedicate this one remaining area as a quiet retreat for the increasing army who wish to have at least a few available places where they can rough it, forget the rush and grind of civilization while they live and commune with Nature and her wild denizens.

In the western division of this area cold water fishing is one of the main attractions and while such fishing has been seriously impaired, by protecting the watersheds and main watercourses, it can be restored to its former excellence.

The Mogollon Wilderness area could be established and perpetuated without undue sacrifice on the part of those who now hold grazing permits or other concessions in this region. One of the initial movements would be to shut out domesticated animals from the main watersheds and the principal watered canyons, leaving for stock only such watering places as are needed, thus forcing cattle to graze on the mesas, in the dry canyons and on ridges where their best forage occurs.

At present, for the benefit of range permittees, the area is badly encumbered with fences. Ultimately, if converted into a wilderness area, these should be removed and a substantial fence placed around the entire wilderness, with only a

ANCIENT CLIFF DWELLING. GILA CLIFF DWELLERS NATIONAL MONUMENT

A CORNER OF LAKE BURFORD, THE GREATEST WATERFOWL RETREAT IN NEW MEXICO

limited number of ports or gates of entry, where motor travel should end and pack trails begin.

The proposed Mogollon Wilderness contains a few grizzly and many black bears, mule, white-tailed and Arizona white-tailed deer, antelope, beaver, Abert and red squirrels, wild turkeys, dusky grouse, Mearns and Gambel quail, band-tailed pigeons and a great variety of other birds. The historic interest of the region is also of much value; the Gila Cliff Dwellings on the West Fork of the Gila are already a National Monument, while ancient Indian ruins are in evidence in many parts of the wilderness.

At present the area contains more than one-third of all deer found in the National Forests of New Mexico or probably 16,000 or more. Under proper management and complete control of predatory animals, this number should increase to 40,000 and should sustain a 4,000 to 5,000 annual kill. At present the deer are not equally distributed because of poor food conditions and excessive hunting on many parts of the area.

If this area is to be perpetuated as a bit of primitive America, immediate action is necessary. The plan already has widespread support and its execution is one of the outstanding conservation proposals, not for the southwest alone, but for the entire nation. The U. S. Forest Service, so far as has been possible, has aided in staying commercial defacement by limiting road construction. Grazing permittees when made acquainted with the plans and purposes would probably offer little resistance, if their interests were respected.

In creating this wilderness area the first requisite would be to permit the forage and other plant life to reestablish itself on the range lands and watersheds. The second and third requisites would be game law enforcement to the letter and absolute control of predatory animals. Concentrated hunting of wolves, mountain lions and other predatory animals by Federal-State hunters and by individual ranchmen has had its effect in maintaining the present supply of game and especially deer. Creation of this wilderness is not of interest to the sportsmen alone, but to the entire State and the nation.*

*Since the above was written, The Forest Service has designated the Upper Gila River watershed a wilderness area.

NATURAL GAME FOODS

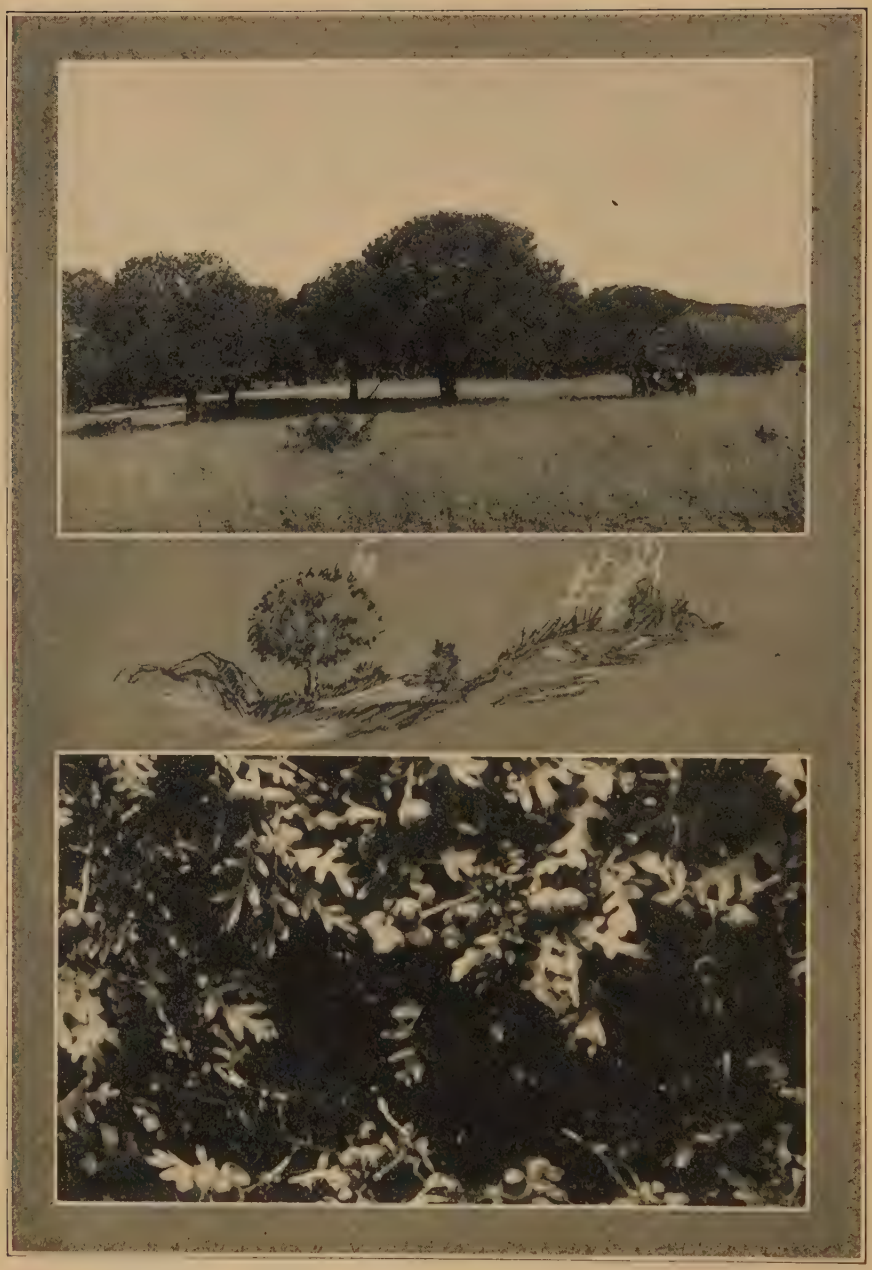
Although the more arid sections of New Mexico often contain scanty vegetation, the timbered and mountainous regions abound with a variety of mast producing trees and shrubs and other game foods. Fortunately, the greatest number of mast bearing plants and trees occur in the southern half of the State where, on account of excessive grazing by domestic animals and prevalence of drought, they are most needed. In the southern area the alligator juniper, pinyon pine, oaks, manzanita, elderberry and sumac are the most dependable, while other shrubs and plants and fruit-bearing cacti produce small fruits and berries freely, which are sought by game of different species. The southern third of the State is rarely without some form of mast each fall or winter. There we find the gray live oak and other oaks, the leaves and twigs of which furnish a staple food for deer and other herbivora in winter and during the dry periods. Pine nuts, pinyon nuts, acorns and a variety of small berries and fruits constitute the mast foods in the northern part of the State.

Rodents, such as mice, woodrats, chipmunks and squirrels, deprive game and especially game birds of much mast by hoarding it in nests or holes and burrows under rocks or in the ground, especially during dry periods, or where grass and weeds are grazed down by livestock and prevented from seeding. During such periods, when the game animals and birds need it most, the myriads of rodents are most active in storing the mast, some seasons taking practically all of it. When there is a heavy crop on the pinyon or juniper, however, such mast is available throughout the winter. In the spring of 1926, as late as April 1, game was feeding freely on pinyon nuts which were as sound as when they were shed from the cones the previous fall.

PINYON NUT PINE (Pinus edulis):

From the standpoint of food and shelter, the pinyon is very important to wild life. It is one of the most abundant and widely distributed trees in New Mexico, and has a perpendicular range in the State of from 5,000 to 8,500 feet. In height, it rarely reaches over 25 feet, although where conditions are favorable, a greater height sometimes occurs. With the juniper, it furnishes the principal evergreen woodland type of the low and intermediate elevations throughout the State, making possible the existence of certain big game at such elevations.

Man, beast and bird, alike, eat the nuts from the pinyon; they are the corn of the forest of the southwest. These rich nuts, which are no larger than a coffee bean, are shed from their cones in late September and October. Long before the nuts are fully matured, however, squirrels and chipmunks begin to feed on them, cutting the immature nuts from the green cones.



A HEAVY MAST OF PINYON AND ACORNS SOLVES THE GAME FOOD PROBLEM

Upper: Pinyon trees heavily laden with nuts, corn of the forest
Lower: Acorns of the Gambel oak, eagerly sought by practically all game

In recent years the gathering of pinyons, especially by Indians, has developed into a paying business, but during a good mast year they are so abundant that this gathering does not materially interfere with the supply for wild life.

Pinyon trees often grow closely grouped and during a good mast year will produce a surprisingly heavy crop. On the sun-exposed slopes and ridges, at elevations from 6,500 to 8,000 feet, the crop is often so heavy that the ground becomes strewn with the nuts. Unfortunately, for the game, however, a heavy crop of pinyon mast does not occur annually but in cycles of two or three years, although not often does a year pass without some nuts being in evidence in segregated areas. Practically all wild game animals and birds feed on pinyons and when the crop is good, fatten on this diet. The nuts impart a fine flavor to the flesh of game thus fattened.

OAKS:

As a valuable mast producer, the oaks rank next to the pinyons, and as a dependable source of food even lead the pinyon, although the mast from the pinyon contains greater nutriment. Acorns are available, though sometimes only locally and in limited quantities, every year and frequently a heavy crop bridges at least one of the years that pinyons miss.

Unlike the pinyons, oaks of some kind occur at nearly all elevations in most sections of the State, thus being even more widely and generally distributed than is the pinyon; however, the diminutive oaks, known as shin oak, are not ranked as trees. Southwestern New Mexico, especially, is favored with a great variety of oaks, most of which are valuable as game food producers. In the southern and southwestern sections, in particular, occur the species of largest oaks, although on the mountain slopes in these sections the shin oak is very abundant.

In addition to supplying game with food, the oaks provide excellent cover, especially in summer when the foliage is thick. All species that occur in the State, except the live oaks, are deciduous, but on some kinds the leaves, after they have died, remain on the trees for some time.

(a) GAMBEL OAK (Quercus gambelii and its sub-species):

In New Mexico the Gambel oak and its sub-species are perhaps the most valuable mast producing oaks. They are common and their acorns are sought by big game, particularly by deer, bear and turkeys. The acorns from oaks, when protected under fallen leaves, often remain in good condition for months. In the higher elevations they are often the only available food for turkeys in winter. In the winter of 1926-27,—until into January—turkeys in some sections were finding so many acorns of the Gambel oak, which they scratched from under the leaves covered with snow, that they paid little attention to bait placed to lure them into traps for restocking purposes.

(b) Gray Live Oak (Quercus grisea):

The gray live oak, although limited in range to the southern part of the State, being particularly common in the southwestern area, is one of the most valuable oaks for game found in the State. In addition to being a mast producer, this is one of the best winter browse trees. It is an evergreen of low scrub type. Its leaves are freely eaten by deer, often being the bulk of their food during severe winters or dry periods when other food becomes scarce.

(c) Shinnery (Quercus harvardii):

This little oak grows over extensive sand areas of southeastern New Mexico, east of the Pecos, and supplies food and shelter for white-tailed deer, the collared peccary or musk hog, prairie chicken and bob-white quail which formerly inhabited this section of the State. It is a dwarf oak, from 18 inches to 4 feet in height, the average being about two feet. It grows densely and produces large acorns which are excellent game food.

Checker-Barked or Alligator Juniper (Juniperus pachyploea):

Although the juniper does not produce the fattening mast that pinyons and oaks do, it supplies an important food which is eaten by cattle, burros, goats, sheep, deer, bears and turkeys; in fact, as a food producer for big game this juniper is of first importance. Unlike the pinyons and oaks, however, it has a more limited range in the State, being confined largely to the mountainous areas above 4,500 feet elevation in the southern half, its northern limit being the southern extremity of the Jemez Mountains.

Juniper berries are especially valuable as game food since they are almost a continuous winter, spring and early summer mast. The berries mature and ripen slowly and remain in good condition, either on or off the tree, for a considerable period. Not all of the trees of this juniper bear their fruit each year, but everywhere a tree here and there is laden with the berries which are shed slowly, often falling on the snow, where they are easily accessible at the time other food is hardest to procure. The berries of the juniper are a life-sustaining and a valuable emergency food.

Manzanita (Arctostaphylos pungens):

Manzanita, which translated is little apple, is a valuable and prolific mast of the desert mountain ranges in the southern section of the State. Its favorite habitat is sun-exposed slopes and ridges, at elevations ranging from 5,000 to 8,000 feet. The fruit of the manzanita, in the form of little firm apples, which when fully matured is the size of a large pea, is an excellent game food. This shrub is an evergreen of a low, stubby, spreading nature and is easily accessible to game. The mast, which ripens in the late summer, is of short duration and is an uncertain crop;

but here and there bushes always produce some fruit. Bears are especially fond of the manzanita berries while other game animals and birds, especially pigeons, gorge on them.

ONE-SEEDED JUNIPER (Juniperus monosperma):

This species, which is the common bunch or scrub juniper, is known generally as a cedar. It is the common evergreen encountered in the foothills, all over New Mexico in the lower borders of the forest area. In addition to furnishing an abundance of mast in the form of purple one-seeded berries, this tree often serves as the only cover and shelter for game and migratory birds, as well as for man and his beasts during winter storms. The mast from the one-seeded juniper constitutes the greater part of the food of multitudes of song and insectivorous birds during the winter and early spring. Robins, thrashers, solitaires and bluebirds flock to the one-seeded juniper zone at this season of the year and partake of the bountiful feast that awaits them. Coyotes, foxes, raccoons and many other animals avidly feed on the berries of this and other closely related junipers which often constitute the bulk of their diet. The berries of this juniper, however, are not a favorite food of game birds and game animals.

OTHER GAME FOODS:

The several species of tangled desert sumac, known also as squaw-brush and skunk-brush, serve both as cover and a food supply for birds, especially for quail and prairie chickens. While in appearance the desert sumacs which occur in New Mexico do not resemble the eastern sumac, the sour berries of the two types are similar in that they are prolific and remain on the bushes for a long period. The fruit does not appear in heads as does that of the common eastern form but in small clusters all over the bushes. These berries are a valuable game bird food.

The elderberry and chokecherry are sought in their seasons by many animals and birds. Wild pigeons, especially, feed on the elderberries while nearly all song birds are fond of both common and chokecherries. Bears wreck the branches of the chokecherry in getting its fruit.

The pitayas, prickly pears and other cacti occur abundantly on the more desert ranges in the northern section of the State, and produce meaty fruit which is eaten by game. Fortunately, cacti produce their fruits even during the driest periods, and were it not for the thorns that guard the fruit, would be easy of access.

The soft young brittle fruit stalks of the yucca, sotol and agaves or century plants provide an abundance of food that is eagerly sought by cattle, deer and mountain sheep. These growing fleshy stalks also furnish a substitute for water, often meeting a very serious need in the spring and early summer, the period during which the stalks appear. These tender stalks contain 90 per cent water.

TRANSPLANTING NATIVE GAME BIRDS

Upper: Method of transportation
Lower: Gambel quail, crated, in transit

INTRODUCTION AND TRANSPLANTATION OF GAME

Years ago wild game was able to reestablish its numbers through natural migration into areas suitable to its welfare. But today, because of barriers incident to civilization, such as settlements, railway lines, fences and many other obstructions due to the white man's occupation of the land, game must be artifically placed on many isolated areas from which it has been exterminated. Game still tends to reestablish itself on suitable range when generally distributed, but where there is an extensive gap, such as that of open plains, deer, bears and turkeys can not safely negotiate such breaks. Furthermore, owing to pursuit, game has become timorous and clings to restricted, sheltered areas rather than to risk its safety in broad open places.

The introduction and transplantation of game therefore are now important features of any progressive game administrative program. Although there are a dozen places in New Mexico little fit for anything but mountain sheep, these interesting animals occur on but three isolated areas. Antelope were formerly abundant on a vast acreage of our arid lands but today only widely scattered bands of these persecuted animals are found. As food and protective conditions become more favorable, they should be restored to their former ranges. There are several isolated mountainous areas from which turkeys have been exterminated, and on which they should be reestablished. The unending demand for quail makes imperative their transplantation wherever there is any likelihood of increasing the quail supply.

Failure frequently attends attempts at restocking because species not adapted to a region are introduced. So far as practicable, native stock should be used for transplanting purposes; however, some must of necessity come from outside the State. Elk, long ago exterminated, have been reintroduced and three separate herds are now well established. Additional animals for restocking no doubt can be obtained from these herds. Sage grouse, also exterminated in the State, should be reintroduced as soon as practicable, to stock the thousands of acres of sage in the northwestern section of the State, which are unattractive to other game.

Blue or dusky grouse, the native forest dwelling form, are absent from apparently suitable mountain areas, particularly the White and Sacramento Mountains and the Black Range. They should be reintroduced in these areas if possible and in the Zuni, Mt. Taylor and other mountainous areas from which they have disappeared.

In the reestablishment of ptarmigan on the arctic peaks of the Upper Pecos, the native or Southern Colorado birds may be safely used. The greatest value of these birds lies in their special interest as southern representatives of a circumpolar group of grouse, becoming snowy-white in winter and brownish in summer.

Bob-white quail were formerly native to eastern and southeastern New Mexico, and when conditions are again favorable, they should be reestablished in these sections. They probably will thrive also in the Lower Pecos and Rio Grande Valleys under the reclaimed conditions. For restocking purposes I would recommend getting the birds from Western Texas or from a source no farther removed than Western Oklahoma in order to secure a suitable strain and avoid obtaining the paler colored, imported bob-whites from Mexico. Texas bob-whites, to which the New Mexico form belongs, are best adapted to climate and conditions in New Mexico.

As respects prairie chickens, and to some extent pin-tailed grouse, since these birds remain in considerable numbers on their natural ranges, their spread is only a matter of proper protection against law violation and the maintenance of suitable ground cover.

There is one fine bird—the ruffed grouse or northern partridge—which was not formerly found in the State but which appears likely would thrive in the mountainous areas of the northern section. A mountain-dwelling sub-species occurs in northern Colorado and northward. An experiment in introducing this fine game bird would be well worth trying on the head of the Pecos, in the vicinity of Taos and on the Red River, near Red River town. In these sections the birds should find congenial conditions.

Since the State is not prepared to care for buffalo, it hardly seems practicable to introduce them until such time as necessary enclosures can be provided. As relates to buffalo and other big game, however, individuals, financially able and so inclined, might well be encouraged to stock some areas with such animals.

The trapping and transplanting of game should be carried on under the supervision of capable men who know conditions in the State as well as the range requirements of the species to be transplanted. Food and natural ground cover, control of predatory animals, safeguards against illegal hunting and many other matters should be carefully considered.

In the transplanting of wild game it is very important to capture, move and release the game as quickly as possible. Furthermore, game birds, in particular, better survive captivity while being transplanted if kept in dark, burlap lined crates with gauze or netting front. When confined in crates of this type, they appear to be less frightened, most of them eat food readily and do not injure themselves in trying to escape.

During the period of the game survey successful experiments in capturing and transplanting both quail and adult wild turkeys were conducted. Out of a total of 344 Gambel quail trapped in the southwestern area of the State, 337 were distributed, in excellent condition, in 32 releases throughout the eastern section. A total of five birds died and two escaped. Nine adult wild turkeys were trapped and moved from the White Mountains, near Alto, to the Sandia Mountains near Albuquerque. Some trouble was experienced in securing the old gobblers uninjured, however, this trouble can be largely overcome in the future by using a different type of trap which was devised during the experiment.

When introducing and transplanting game, so far as practicable, it should be placed on refuges or otherwise protected until it has an opportunity to become established.

The capturing or transplanting of adult big game is much more difficult than taking the young. It is usually impracticable to capture adult deer, mountain sheep and antelope, unless the adults have become more or less semi-domesticated by continuous contact with man. The taking of young or partly grown animals is the more practicable method. The Bureau of Biological Survey, U. S. Department of Agriculture, has demonstrated the practicability of capturing and artifically raising young antelope for restocking purposes. Large numbers of young mule deer have been captured and raised in a similar manner under supervision of the Forest Service on the Kaibab Reservation in northern Arizona during the last few years. No doubt time will prove that practically all big game can in this manner be transplanted.

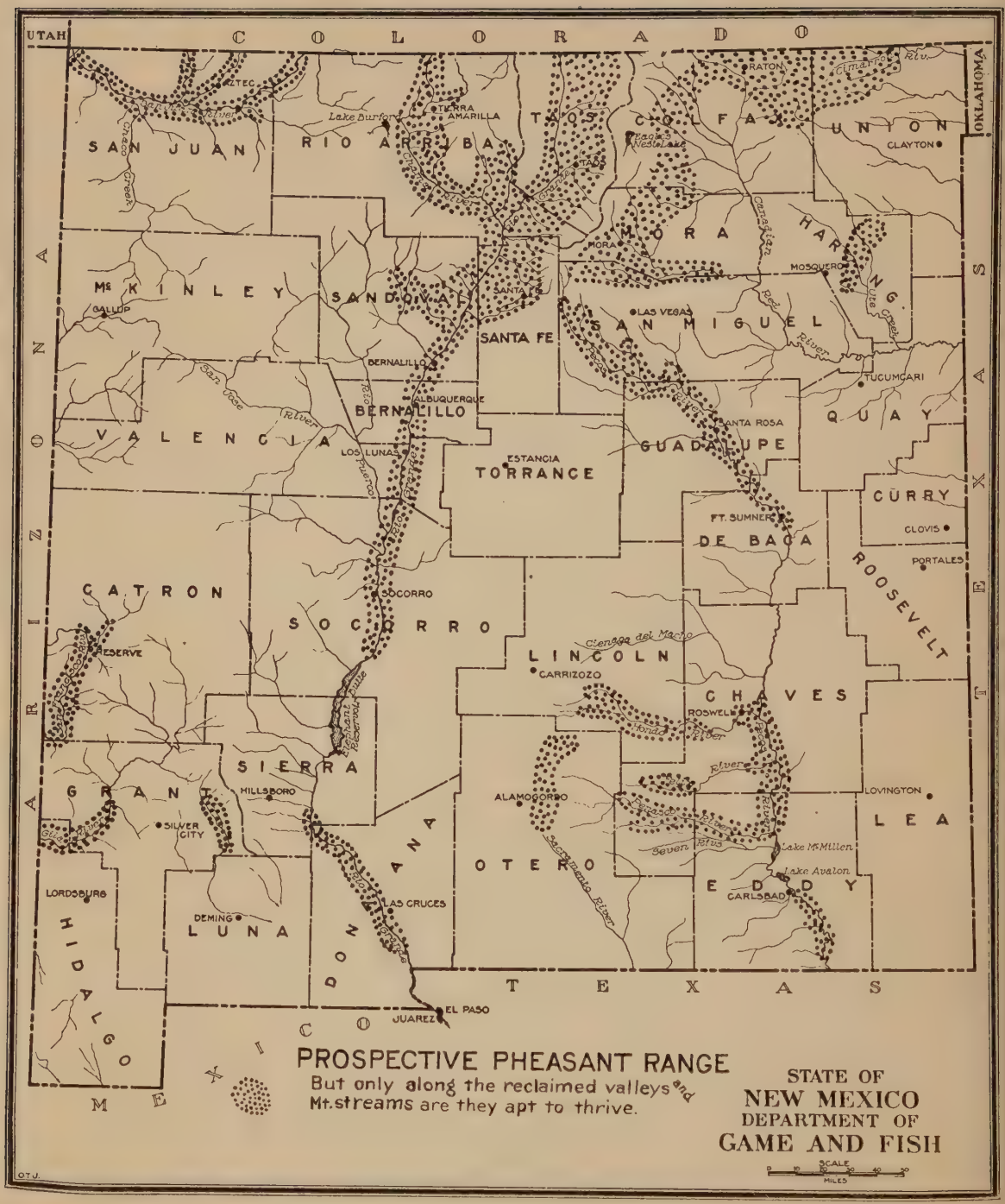
In reestablishing turkeys the use of wholly domesticated birds should be a last resort, in fact there is no need for using domesticated birds for this purpose in New Mexico. While it is true that our domestic turkey is a descendant of the wild bird found in Mexico, many centuries of domestication reach back to this ancestory. Furthermore, with present conditions under which wild birds must live, the domestic birds are not well fitted to survive the perils surrounding them in the wilds while re-learning self-protection. It is strongly urged that only wild stock be used for such purposes.

The native wild turkeys of New Mexico and Arizona are a distinct geographic race peculiar to this region and differing in color from the original wild stock from Vera Cruz, Mexico, of which our domestic turkeys are descendants. For this reason only native wild birds should be used for restocking the State and thus save for posterity the characteristics of the local race, which would be destroyed by introducing the domestic birds. Who among sportsmen does not have greater pride in knowing that he is on the trail of true unmixed strain of wild turkeys instead of domesticated birds forced into the wild state to give some hunter a vicarious thrill?

Of the native wild game birds, quail are the easiest to trap and transplant and they most readily adapt themselves to new range, but judgment must be exercised in the selection of the species in order that it be adapted to the range selected. In the future, the Game Department will be in position to give information on this subject.

EXOTIC FORMS:

If Americans were as patriotic regarding their wild life as they are of their nationality—and they should be—American game would enjoy greater privileges to perpetuate itself. But, unfortunately, we look longingly beyond the oceans and to the antipodes for magical forms that will meet all the requirements of our fancies. Fortunately, New Mexico and the balance of the southwest are largely


UTAH
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Mc KINLEY
SANDOVAL
SANTA FE
SAN MIGUEL
QUAY
VALENCIA
BERNALILLO
GUADALUPE
TORRANCE
CURRY
DE BACA
ROOSEVELT
CATRON
SOCORRO
LINCOLN
CHAVES
SIERRA
GRANT
OTERO
EDDY
LEA
LUNA
HIDALGO
TUCUMCARI
CLAYTON
RATON
MOSQUERO
LAS VEGAS
SANTA ROSA
CLOVIS
PORTALES
FT. SUMNER
CARRIZOZO
ROSWELL
LOVINGTON
ALAMOGORDO
HILLSBORO
SILVER CITY
LORDSBURG
DEMING
LAS CRUCES
EL PASO
JUAREZ
GALLUP
ALBUQUERQUE
SANTA FE
LOS LUNAS
ESTANCIA
TIERRA AMARILLA
AZTEC
Lake Burford
Lake McMillen
Lake Avalon
Seven Rivers
Ciengga del Macho
Elephant Butte Reservoir
Rio Grande
Pecos River
Red River
Canadian River
Mora River
San Jose River
Gila River
PROSPECTIVE PHEASANT RANGE
But only along the reclaimed valleys and Mt. streams are they apt to thrive.
STATE OF
NEW MEXICO
DEPARTMENT OF
GAME AND FISH
SCALE
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immune from dangers which surround the introduction of exotic forms. The aridity of the climate largely precludes the possibility of their thriving to the extent that will bring serious conflict with our hardy native forms. Even if we have the inclination to do so, it is very certain that we cannot materially improve upon our native species under natural conditions. If our superb wild turkeys and dignified prairie chickens were accorded the careful attention that we heap on gaudy imported pheasants or other game, they, too, would respond to such treatment. Americans are hard to please, a commendable trait in many matters, but they should learn to appreciate the general superiority of their own wild life. Our experiences with the English sparrow, starling and carp and the experiences of Australia with foxes and rabbits should serve as a warning to us in our future importations. We never know when fatal diseases or, in the case of related forms that interbreed, inferior strains may develop. The future welfare of the wild life of the State demands caution and careful study before exotic species are brought in.

There are exceptions, however, and common sense should govern any action along this line. In the case of tried species, as hardy forms of pheasants and probably the Hungarian partridge, they may be introduced to advantage since such forms probably never will spread beyond the limits of reclaimed valley lands where, even though they do become ever so abundant, they can be readily reduced in numbers and thus are unlikely to interfere seriously with native game birds. At the same time they may prove to be a decided addition to our game resources and incidentally alleviate the increasing drain on native species.

There are many hundreds of miles of reclaimed agricultural valley land in New Mexico on which pheasants should thrive. The Gila, Rio Grande, Pecos and San Juan are the more extensive of these, while there are hundreds of smaller reclaimed valleys and canyons in the mountainous areas where apparently they should do well.

Many unsuccessful efforts, however, have already been made to establish these birds in the State. It is possible that they would thrive if given more careful attention as to choice of locality and protection from their enemies while being established.

Such birds should be provided with suitable retreats and with food during the winter and early spring period because of the usually barren condition of the agricultural lands at this time. This is the hardest period on all game birds. Neither pheasants nor any other introduced species can be expected to materially increase New Mexico's hunting without they are insured cover and a year-long food supply. Growing crops and weeds provide the wants of pheasants in summer but not in winter; and until such time as they are given the necessary attention, their importation will no doubt continue to result in failure.

STAND BY NATIVE SPECIES:

Where pheasants and other exotic forms are introduced, they should be plainly subordinated to native species. States which have a scanty supply of native game

or which lack range for American game frequently introduce foreign forms as an alternative but New Mexico does not belong to this class. She has a variety of native species and an abundance of range for all of them. It is a self evident fact that the native wild life having passed a long period of adaptation to the arid conditions is preeminently fitted to this region.

While in many states game farms are now being operated for restocking purposes, especially in states with ample funds, it would not be feasible for New Mexico to experiment along this line, at least not for many years to come. Maintaining such farms is exceedingly expensive and they require skilled management. It is very probable that in the not far distant future private breeders will be able to furnish birds for stocking and restocking purposes more economically than the Game Department, with its limited funds, could possibly raise them. New Mexico is fortunate in that it still has a goodly supply of native stock of most species for restocking purposes.

ORGANIZATION—THE KEY TO WILD LIFE CONSERVATION

The interest manifested in game conservation in New Mexico during the last few years can be attributed almost wholly to the organization of progressive sportsmen recruited from the ranks of the leading citizens in all walks of life. The first game protective association—The Southwestern Game Protective Association—was founded September 24, 1913. From this nucleus progress and expansion have continued until today there are in the State 30 active associations, with an aggregate membership of over 4,000, all of which locals are affiliated with the New Mexico State Game Protective Association.

To appreciate fully the development that has taken place in organization, a brief history of the early struggles of sportsmen and conservationists of the State is necessary.

Away back in the dark beginning, efforts to arouse interest in Statewide game protection elicited mainly discouragement and a storm of opposition from politicians. The efforts of two determined figures, valiantly fighting the tide of resistance, stand out as the genesis of wild life conservation in New Mexico. The sponsors of this worthy cause were none other than Aldo Leopold of the U. S. Forest Service and the late Miles W. Burford of the Southwestern Game Protective Association. These "fathers of game conservation" in New Mexico, gave the lighted torch to a few determined supporters to bear to the battle front and to the vision of the public. Public sentiment and public support have rallied to the cause until today wild life protection is a matter of public interest and concern. There have been many other trail blazers in game conservation in New Mexico, several of whom have passed to the great beyond. The results of their labors become more evident with the passing of time.

But these initial efforts would have been futile without the determined follow-up work on the part of more recent workers who earnestly espoused the cause and ultimately succeeded in concentrating forces in the present strong affiliated State organization, which commands the respect and support of every substantial citizen of New Mexico. So also, work that is being done today will prove to be only temporary unless carried on by determined sportsmen of tomorrow.

Political strategy and influence have done more to retard and stifle progressive game management throughout the country than all other causes combined. A naturalist and real conservationist is rarely a politician and a politician never can fill the shoes of the former. No business is in greater need of especially qualified men to administer its affairs than is the business of game management. If anyone doubts this, let him make an effort to find capable leaders with all the desired qualifications! They are not to be found in the ranks of the avid office seekers, and the sooner State governments come to the realization of this fact, just that soon and

no sooner is there any possibility for the realization of the sportsmen's hope for scientific and effective game management.

As a rule, politicians are antagonistic to progressive game legislation because they fear the loss of dominating power and political plums with which to pay campaign obligations. Strong organization is the only means of hurdling such barriers. Any Game Department is only as strong and progressive as its organized sportsmen. Organized sportsmen are the pulse of a State game department.

As a crowning act in their most determined fight for clean administration of their Game Department, the sportsmen of New Mexico have at last succeeded in lifting the Department out of the political mire and in placing it on clear avenues of progress. The victory has long been the goal of sportsmen. They realized it was their biggest problem and their first duty. The successful advancement against the fortress of politics was slow. The powers of domination contested until the arrival of sympathetic state administration and the final collapse of political rule.

In fighting for their independence the sportsmen's most effective weapons were their convictions of a worthy cause and their independence of any legislative appropriation, thus obviating any reason for political interference.

But the needs in game conservation have only been approached; obstacles have been removed so that effective work can now be accomplished. Any cessation on the lines of duty would prove fatal. The conservation of wild life is a complicated business, the administration of which demands at all times the best efforts of trained leaders and executives and well defined policies. Organized resistance of personal interests must be met with organized opposition, backed by power.

The local gatherings of sportsmen and the annual meeting of the State Game Protective Association are now events of Statewide importance. Even outside sportsmen are taking active interest in these gatherings. The strong El Paso, Texas, association, a product of New Mexico progress, has cast its money and influence with the Sunshine State, where lie their greatest interests afield. The deliberations at the annual sportsmen's gatherings are entered into with the same business determination and even more enthusiasm than are manifested at most meetings of similar organizations.

Cooperation and coordinated effort are absolutely essential in the execution of game protective policies. Rather moral suasion with any organization than antagonism. By cooperating with cattle and sheep growers' associations and farm and civic organizations, the organized sportsmen will obtain the greatest benefits. Where presented in a practical way, game conservation readily wins the support of all substantial citizens. Education is the best means of promulgating and establishing the principles of wild life conservation. To arouse interest where apathy existed and to shed light where darkness prevailed are the business of organized sportsmen and their representatives—the State Game Commission and the State Game Department.

After all is said regarding the big outdoors, the wild creatures that animate the forests, mountains and streams, are the charms about which the outdoor quest

centers. Had not the high purpose of wild life conservation in New Mexico been instilled in the minds of the public through activities of sportsmen's associations and the State Game Department, wild life of all kinds, because of the growing accessibility of the open spaces, would be nearing extermination today.

While sportsmen's organizations are important and necessary anywhere in the conservation of wild life, their existence is especially imperative in the sparsely settled states of the southwest, as in these states we must rely largely on public sentiment and support to accomplish what an adequate and effective deputy warden service accomplishes in the more thickly populated and wealthier states. Because of insufficient funds to maintain a year around deputy warden service, sportsmen's organizations must largely supplant this service. It is encouraging to note that in New Mexico conservation policies that appeal to the integrity of men are proving to be more effective than punitive measures. An earnest member obtained for a sportsmen's association is worth many apprehensions, since usually he proves to be a worker for wild life conservation while the apprehended man may remain an enemy.

I do not wish to imply that conservation officers and application of the law are not important in the conservation of wild life. They are a very necessary adjunct to any well administered game department. Many people persist in violating game laws, opportunity alone being needed, and for such people the strong arm of the law seems to be the only alternative. Such violators, however, are not numbered among active sportsmen.

The game is the property of the people and to abate the primitive desire to kill will require considerable education. Pioneer Americans could well afford to use the liberal supply of game for food and clothing. So great was the supply that for generations it seemed inexhaustible. But the collapse came long ago. Today with the great increase in population and the rapid diminution in the supply of all forms of wild life, the ratio has been reversed and is so out of proportion that the hunter must stay his itching trigger finger. At least, he must be content with a smaller bag limit until the game has had an opportunity to reestablish itself. But in the future, because of the ever increasing number of hunters, safeguards in the way of bag limits and refuges must be carefully provided. Cooperation of active game protective associations is the safest means to these ends. Every hunter should become an active conservationist and thereby contribute his efforts toward maintaining and increasing wild life rather than to obtain his hunting and fishing at the expense of services rendered by his fellow-sportsman.

To facilitate further the activities of organized sportsmen, conservation committees, representing the sportsmen in both houses of the State legislature, should be appointed, such committees to sponsor the cause of progressive conservation in the State and to obtain desirable legislation, and in general to safeguard the interests of the sportsmen and the public.

City organizations and clubs, as the Chamber of Commerce, Rotary Club, Kiwanis Club, Lions Club, Woman's Club, and other organizations could greatly

advance the cause of wild life conservation and thus promote the welfare of the State. Where the support of such organizations is enlisted, they usually render commendable service. The State press when properly informed is in a position to aid greatly the cause of wild life restoration and protection and nothing makes more interesting reading for the general public than articles dealing with fish, birds and animals.

Another medium through which the cause of conservation could be still further advanced and one that should not be overlooked, is the Boy Scouts organization. Through the proper teaching of Boy Scouts any broad and intensive State or national conservation policy now established, can be maintained. There is great potential power for conservation in the minds of these young Americans, the future backbone of the nation. While life to them is thus made more interesting and spectacular by their association with mountains, forests and streams and the wild creatures that animate them; it is also made more complete because of development of broader characters and physical attainments. By such training, the Boy Scouts of today, when they become leading citizens of the land, will be able to accomplish things that are beyond the reach of active sportsmen of today.

SUMMER LODGES IN THE LINCOLN NATIONAL FOREST, CLOTHED IN THE BEAUTY OF WINTER

RESPONSIBILITIES OF THE STATE GAME DEPARTMENT

For the first time in its history, the New Mexico Game Department is in a position to function unencumbered—free from political barriers—and to conduct its business solely in the interest of the citizens of the State. The change from a political office to one of practical game administration imposes new responsibilities on the Game Department, to meet which requires public spirit, experience and ability.

Under present conditions game protection and administration form a business of a most complicated kind, which calls for rare qualifications and skill. Qualified leaders for game departments are few since they have not been developed owing to lack of opportunity and to a general lack of concern on the part of sportsmen. This is changing, however, and the demand for capable men is the best proof of the growing need for them. Game administration should be entrusted to men with the highest possible qualifications, including practical, scientific training and a thorough knowledge of existing conditions.

In order to accomplish its highest purposes, the Game Commission must have, first, sufficient authority to conduct the progressive program which the sportsmen have outlined and, secondly, money to execute such a program. When we compare the insignificant sum of $50,000, which was available to the New Mexico Game Commission in 1926, with the hundreds of thousands of dollars annually expended in most other states for game and fish protection, we cannot but admire the courage of the New Mexico Game Commission in undertaking its big program. Fortunately, new legislation, sponsored by the sportsmen, will provide more money.

The jurisdiction of the Game Commission is still too limited to fully serve the growing needs of all wild life and problems that both directly and indirectly have a bearing on such life. A State Conservation Commission, with game administration as the major duty, could best serve the needs. Enforcement of game laws, establishment of refuges and the rearing and planting of fish are only some of the problems that now confront Game Departments. Restoration and conservation of watersheds and range lands, protection of natural growth of tree and other plant life along watercourses, guarding against polution of streams, State parks and their administration and many other matters of like nature are at present beyond the jurisdiction of a Game Commission. A State Conservation Commission could best administer the needs of wild life and related conservation activities in New Mexico.

Since the Game Commission represent the sportsmen, the Commission, in order to function to the best advantage, should have the benefit of liberal privileges, such as the power to open or close and shorten or lengthen seasons, after a species has once been placed on the protected list by an act of the Legislature. Often some unexpected or unusual condition arises that requires quick action, but where legislative approval is required the Commissioners' hands are tied.

NEEDS:

In addition to a well selected Game Commission that functions in harmony with the State Game Protective Association, a capable chief warden with vision and initiative should at all times be at the head of the Game Department to keep in progress projected plans of the Commission. The chief game warden, as well as all of his deputies and other active workers of the Game Department, should be not only capable but should be saturated with enthusiasm for the work and the big outdoors. Such men are not afraid to give an extra measure of service.

Too often petty jealousy manifests itself on the part of Game Department workers. Such jealousy injects venom into Game Department activities and chills progressive advancement. Men of ability and enthusiasm should not concern themselves about credit and honor; these, happily, present themselves when justly earned.

In the interest of efficiency and equitable administration, the State should be divided into at least four districts or sub-divisions, each to come under the direct supervision of a district warden or conservation officer. Such division would result in more intimate contact with and knowledge of conditions. The needs of every part of the State could thus best be served. It would rather facilitate matters to have a representative on the Game Commission from each subdivision, perhaps the chief warden to be designated as a fifth member. Such division of the State should be along the well defined lines already existing—the Rio Grande north and south, and perhaps the Santa Fe Railway line, from Gallup to Clovis.

A capable field secretary or deputy at large to take the Game Department to the people and bring the people to the Game Department is a much felt need that should be supplied as soon as funds permit. Such a deputy should have a good knowledge of game, fish and birds, and he should be able to give moving picture lectures before schools and public gatherings as well as to broadcast over the radio. And more especially he should be able to assist in organizing new sportsmen associations and cooperate closely with established organizations—learning local needs, ironing out difficulties and reviving the enthusiasm of sportsmen where such aid is needed. The Department is also in need of a game specialist to pass on or select new refuges and sanctuaries, decide on additions or eliminations, to see that refuges are properly posted and to attend to the introduction and transplantation of game. Skill and a thorough knowledge of wild life and of conditions throughout the State are the main qualifications for this position.

Filling these positions with capable men will not be an easy matter. If men with the desired qualifications are not available, those who give promise of developing into capable men for this kind of work should be chosen.

A paid deputy field force as adequate as funds will permit should be provided, the greatest need being for the district deputies for each subdivision of the State, after which such additional help as funds permit and conditions warrant should be provided.

Non-paid deputies, though serving a useful purpose, do not as a rule make

very satisfactory wild life conservation officers, for reasons already given. They can not supplant a paid deputy force; they merely supplement it.

In the selection of men for field service, personal interests and influences should be disregarded. Qualifications only should be considered. In such selections the Game Department should have the cooperation of game protective organizations but not through pressure to appoint men from motives of personal interest. The compensation should be sufficient to attract the best available talent to the various classes of service. Political activities on the part of Game Department employes should be absolutely prohibited and should be sufficient cause for dismissal.

COOPERATION:

Through close cooperation with organized agencies, as sportsmen's associations, U. S. Biological Survey, U. S. Forest Service, Izaak Walton League of America, farm organizations, city organizations, as well as with the State press, the Game Department can accomplish most effective and lasting service.

The greatest possibilities for immediate service to the Game Department lie in its closer and more extended cooperation with the Bureau of Biological Survey —Federal and State predatory animal hunting forces. This cooperation is of great importance since this service is for the protection of classes of animals as property or game against another characterized by its destructive qualities. The more closely we study the relation of predatory animals to game, with the present reduced numbers of game animals, the more we are convinced that the predatory forms must be brought under complete control in game covers. The organized Federal and State forces of the Biological Survey are the logical ones to render this service.

Biological Survey forces alone have unrestricted privilege of working in the State game refuges. Since these hunters are carefully selected and under close supervision, the Game Department extends this privilege to increase efficient service.

CLOSING OF SEASONS:

Open seasons for hunting game of any kind or for fishing should be as general and uniform as practicable. The creation of ample refuges and sanctuaries, effectively administered, largely eliminates the needs for the closing of seasons locally, leaving elsewhere in the State the same species subject to hunting. Local closing of seasons on a species tends to create excessive hunting in other places and thus often does serious harm.

Putting any species on a continued protected list in a part or all of the State should be a last resort. The most serious violations with which the Game Departments have to contend are those dealing with species on which there is no open hunting season. Moreover, to stop fishing or the hunting of game, or to try to do so, takes away needed revenue and detracts from the interest and pleasure of the law

THE OPEN SEASON

Upper Left: Getting into good game country, Mogollon Mountains

Photo by D. E. Moore.

Upper Right: A retriever in action

Lower: Successful hunters and their game. Black Range

Photos by W. Lee Wilson.

abiding citizens, and gives the violator his desired opportunities. Local closed seasons also increase the danger to human life as result of congested hunting on areas where hunting is permitted.

There is another phase which has a bearing on local closed seasons that the Game Commission should take into consideration. With the growing interest in and higher regard for hunting, sportsmen in planning their hunting trips are largely governed by the abundance or scarcity of the game. If quail or turkeys have a bad year and become scarce and that fact becomes generally known, hunters in response to the higher principles of sportsmanship limit their hunting trips and kill.

So long as it is possible to do so, it is better to give the sportsmen their season for hunting. If the needs demand, the seasons can be shortened and the bag limits made smaller. The serious objection is, not so much to closing seasons where needs demand, but to closing seasons locally as in one county and permitting hunting in another, probably adjacent to the county having the closed season.

UTILIZING SURPLUS GAME:

In game protection and restoration it is very necessary that the surplus above carrying capacity of the range be utilized. Local situations in this respect must be met independently of statewide conditions.

In New Mexico today, as scarce as big game is at large, there are a few isolated areas where the safe range carrying capacity for deer has about been reached. It may be that within another year or two it will be found necessary to permit the killing of does and young deer along with bucks for a season in order to properly equalize the situation. If necessity demands that such drastic action be taken, the Game Commission should be given authority and should not hesitate to execute such plans, with necessary safeguards. While it is true the forage conditions of the deer range in question are below normal, this fact does not alter the need; it requires all the more that the range be not overburdened.

As seriously reduced in numbers as are antelope in the State, there are a few places where, within a year or two, it might be practicable to permit the killing of a few of the bucks to prevent overabundance; otherwise Nature will provide more drastic means of elimination. Such means of reduction would apply more especially to animals located in areas where natural expansion is improbable.

In former times overabundance of game was ultimately met by natural controlling factors, as predatory animals or voluntary distribution, but with the elimination of predatory animals and limited range, often of impaired condition, necessity for control by man becomes evident. The breeding stock must be retained in a number warranted by the range but no greater. No matter what the species nor what the attitude of sentimentalists, the surplus must be disposed of or the results will be disasterous. Starvation and disease are the most wasteful means of elimination; but Nature will apply them.

ARTIFICALLY FEEDING GAME:

The feeding of big game on its native range, theoretically, may appear very simple; but when such feeding is put into practice, many difficulties are encountered. Especially true is this in the southwest, where the main big game range is inaccessible. If the need for feeding big game in a given locality could be foretold in advance of severe winter storms, before travel in the mountains becomes practically impossible, the saving of animals by feeding would be simplified; but, unfortunately, this is impossible. In New Mexico, feeding of deer would no doubt offer the biggest problems.

Turkeys have been successfully fed in various sections of the State. Generally, they are particularly in need of feeding during years of scanty mast and the most severe winter weather, especially during the latter part of the winter. At this time of the year the birds often congregate in large flocks in the foothills and are easily located. Generally, turkeys that range near settlements, where natural food conditions are poorest due to overgrazing by domestic animals, are most in need of attention and, fortunately, their wants can easily be cared for. The fact that the food of turkeys and other game birds consists principally of grain, a food that is easier to secure and transport than hay, the food of big game, further simplifies their feeding. Advantage should be taken of turkey feeding to obtain birds for transplanting purposes.

Naturally, quail can be fed even more easily than any other game birds or animals because of their accessibility. The feeding of both quail and waterfowl has been successful and should be practiced wherever it is needed.

Unless natural range forage is better conserved in the future than has been the case in recent years, antelope will most need help in winter so far as artificial feeding is concerned. In 1923 antelope actually died of starvation on a few of the more arid or desert ranges occupied by them in the State. Overgrazing of ranges, followed by severe drought, was the cause.

Should the historical snowy year of 1888 repeat itself in New Mexico—and history has a tendency to repeat itself—antelope will need assistance in the way of artifical feeding. The latter part of 1888 heavy snow fell and lay in the higher areas until the following March. Old settlers claim that great numbers of antelope starved on the elevated plains and mesas west and southwest of Magdalena, where at that time they were abundant. The animals would congregate along the roads to pick up the little lost hay from loads that were being hauled to some domestic animals, many of which also perished. During this severe winter only a limited number of antelope remained in the high country. At that time the country was open and many of them drifted southeast into lower or more sheltered areas, where the snow did not lie so long. Today the few isolated bands of antelope remaining over the Upper Gila drainage and on and adjacent to the San Augustine Plains would be too timorous to leave their accustomed range and would have to be given

some assistance in order to enable them to survive a real snow winter. These are the herds which the Game Department will have to watch and where, if necessary, utilization of surplus animals should be permitted.

Local citizens and Game Protective Associations can be relied upon to render assistance to their game; but in doing so, they need the cooperation of the State Game Department which should be prepared to act in such emergencies.

DIVISION OF FUNDS:

In order to obtain the greatest possible benefits from the limited revenue available, there should be an equitable division of funds for game and for fish propagation. The cold water fish supply is almost wholly dependent on artificial means of propagation and distribution, largely entailing cash outlay. Reproduction of game is dependent both on its own resources and advanced conservation policies which, when adequately applied also require expenditure of money. Practically the entire State is potential game territory and there is no limit as to the possibilities of increasing and expanding the big game supply while cold water fishing streams are limited. The fishing resource should be fully developed and maintained but not at the expense of depriving the State of the opportunity of becoming one of the greatest game fields in the southwest.

HIGHWAYS OF BEAUTY, INTEREST AND COMFORT

Upper: Lover's Lane, near Roswell
Lower: Summit of the Sacramento Mountains, Mescalero Indian Reservation

BIRDS AND TREES

"Beauty if it does not take precedence of Utility, is certainly coeval with it; and when the first animal wants are satisfied, the aesthetic desires seek their gratification."

G. H. LEWES

Birds and trees are among the earth's most valuable possessions. To man they are a stimulus of the highest order. Nothing is more soothing to wearied souls than the singing of birds and few things earthly more pleasing to the eye than trees. Trees are an economic and aesthetic asset everywhere but especially so in the arid southwest.

As one travels the highways that parallel the watercourses in New Mexico, along the lower Rio Grande, for example, he finds himself imprisoned between wire fence lines just beyond which are spreading trees and shady groves that benefit no one. Why have not civic organizations and highway departments created or included a few such places along the highways for the benefit of the public? If such were available, there might be less burning of "gas" in racing up and down the roads and perhaps fewer lives snuffed out on account of congested traffic, and people would have a better opportunity to enjoy their outings. Even in our National Forests, which for the most part are rather remote from the congested communities, the most accessible places too often are privately owned and the recreation seeker has difficulty in finding attractive summer camping places without pushing well into the mountains. By correcting this condition, New Mexico could add immensely to the safety, comfort and pleasure of not only her own citizens but of the traveling public as well and thus render the country within her borders more attractive to all. Under present conditions the motorist often must travel for many miles without an opportunity to leave the pavements or dusty highways for the shelter of a tree to have lunch or to rest in comfort. To provide such shady places is one of the many needs that might be met by team work between a Conservation Commission and local communities. If there is any place where the public should have an opportunity to enjoy trees, that place is in the land of perpetual sunshine, the southwest.

In their tastes and high degree of regard for their kind, birds often bear a resemblance to man. Their attractive qualities and the beauty of trees are especially valued about human habitation. On newly acquired lands the urgent need of shelter may make for lack of attractiveness due to other pressing needs but no worth while civilization can be created and maintained without substantial and attractive homes. There is in the southwest today need for the development of more attractive homes, surrounded with beauty such as attracts and holds the interest of youth and provides maturity with well earned comforts and pleasure. Without trees and flowers, and the feathered folk they attract, homes are often little more than stop-

TREES ARE AMONG NATURE'S MOST USEFUL ADORNMENTS

Upper: Cottonwoods and live oaks, Greenwood Canyon, near Silver City
Lower: Gila River, with dense tree borders. Near Riverside

ping places. On New Mexico's reclaimed lands, the beauty and value of trees as well as of song and insectivorous birds are emphasized.

Up to the present time the natural condition of mountainous forests in the State has not been disturbed by commercial activities to the extent of seriously menacing tree-dwelling birds. But where the natural cover and tree life have been impaired, and over plains and naturally treeless sections, efforts toward attracting Nature's songsters, the birds, are of greatest benefit. Every tree that has been induced to grow in home building and under reclamation projects over the arid southwest has contributed to the increase and support of valuable and attractive birds.

The Pecos Valley of southeastern New Mexico is a striking example of man's ability in creating beauty. The utilization of flood and underground water has had amazing effect in transforming into verdant fields with trees and singing birds a valley where formerly monotonous grass lands or desert shrubs only were in evidence. Many valuable birds find congenial living conditions in this valley where formerly they winged their way swiftly through in migration to more suitable places. Some forms, as the handsome scissor-tailed flycatcher and the orchard oriole, have even extended their summer habitat northward in order to appropriate to their own use this man-made bird haven.

Not only in the Pecos Valley but in many other sections throughout the State and the southwest, the white man's artificial application of water has triumphed over Nature and produced marvelous results.

The higher mountainous areas of the State possess a magnificent wealth of tree life. Pine, spruce, fir, aspen and many other species abound and create beautiful forests in which wild birds, beauty and human interest have a common meeting ground.

Even those who are not interested in the aesthetic value of birds, if such there be, should appreciate their economic value. With but few exceptions, the smaller birds are insect eaters of a high economic value. Under most favorable living conditions for birds, and when the birds are most numerous, their ever-urging appetites for the hoards of insects that constantly menace the land aid in keeping the pests in check and sometimes actually control these pests. Scientists warn us that the world would not long be habitable for man if all the birds were exterminated, so potent are they in aiding in the control of injurious insects. Even with the aid of birds, man's efforts often fail in the conflict that ever exists between man and the multitudes of tiny life that ever oppose him.

Successful agriculture, range forage and forestry are largely dependent on the insatiable appetites of birds, and any consideration extended them by man is well repaid. While it is true that some birds occasionally commit depredations to vegetables, fruits and other agricultural products, temporarily outweighing their economic value, such depredations are usually of a local nature. Condemnation in such cases should be confined to individuals and not to the entire bird population. The U. S. Biological Survey, federal custodian of migratory wild birds, is prepared to give any information needed on this interesting subject.

The more receptive the mind becomes to truth and the wider its explorations into the intricate subject of natural balances and Nature's economic system, the greater is the tendency in accepting things in Nature as beneficial under natural conditions. Anyone who has an intimate knowledge of wild birds is constrained to the belief that none are without some value although too often this value is not understood, not recognized nor accepted when it fails to contribute directly to the selfish ends of man. Under certain conditions some species or individuals of a species must be controlled but competent judges only should have authority to say when and where.

Migratory birds, including not only song and insectivorous kinds, but geese, ducks and other waterfowl, are the property of no one, yet in a sense they are the property of the people of all the states and should so be respected wherever they may be. In handing down its decision affirming the constitutionality of the Migratory Bird Treaty Act between the United States and Canada, the U. S. Supreme Court, the highest tribunal of the kind in the land, in the following terms paid the highest tribute ever accorded feathered travelers:

"Here a national interest of very nearly the first magnitude is involved. It can be protected only by national action in concert with that of another power. The subject matter is only transitorily within the State and has no permanent habitat therein. But for the treaty and the statute there soon might be no birds for any powers to deal with. We see nothing in the Constitution that compels the Government to sit by while a food supply is cut off and the protectors of our forests and our crops are destroyed. It is not sufficient to rely upon the States. The reliance is vain, and were it otherwise, the question is whether the United States is forbidden to act. We are of the opinion that the treaty and statute must be upheld."

HUMMINGBIRD ON NEST

Museum
Exposition Park

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